



List of Workshop Manual Repair Groups

Repair Group

ST - Generic Scan Tool



Technical information should always be available to the foremen and mechanics, because their careful and constant adherence to the instructions is essential to ensure vehicle road-worthiness and safety. In addition, the normal basic safety precautions for working on motor vehicles must, as a matter of course, be observed.

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1.1 Safety Precautions

Check for Technical Bulletins that may supersede any information included in this manual.



WARNING

Failure to follow these instructions may result in personal injury or possible death.

Check the Technical Bulletins for information, cautions and warnings that may supersede or supplement any information included in this manual.

When performing the drive cycle operation, pay strict attention to driving conditions and observe and obey all posted speed limits.

Test equipment must always be secured to the rear seat and operated by a second person. If test and measuring equipment is operated from the passenger seat, the person seated could be injured in the event of an accident involving deployment of the passenger-side airbag.

The fuel system is under pressure! Before opening the fuel system, place rags around the connection area. Then release pressure by carefully loosening the connection.

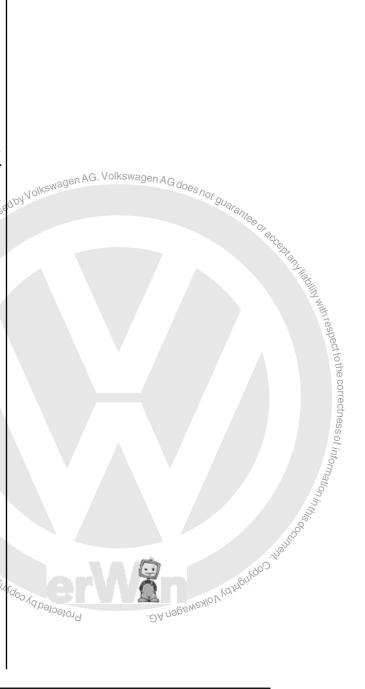
The engine section of the fuel system, after the high pressure pump, is under extremely high pressure! When working on engine or fuel injection system, fuel pressure must be relieved to residual pressure before opening high pressure components. Refer to the Service Manual for the proper procedure.

If the battery has not been disconnected, the fuel pump fuse must be removed before opening the fuel supply system as the fuel pump may be activated by the driver's door contact switch.

Testing of the EVAP and ORVR systems can result in the escape of explosive fuel vapor. Do not smoke while testing the EVAP system, and make sure the area you are working in is well ventilated.

Observe the following for all procedures, especially in the engine compartment due to lack of room:

- ♠ Route lines of all types (e.g. for fuel, hydraulic, EVAP canister system, coolant and refrigerant, brake fluid, vacuum) and electrical wiring so that the original path is followed.
- Watch for sufficient clearance to all moving or hot components.
- ◆ Do not touch or disconnect the Ignition Coils, ignition wires, connecting parts or adapter cables when the ignition is on or the engine is running or turning at starting RPM.
- Only disconnect and reconnect wires for injection and ignition system, including test leads, when the ignition is turned off.



liability with respect to the correctness of information in this

When removing and installing components from full or partially full fuel tanks, observe the following:

- The fuel tank must only be partially full. How much fuel can remain in the fuel tank may be read in the respective work description. Empty the fuel tank if necessary.
- Before starting work, switch on the exhaust extraction system and place an extraction hose close to the installation opening of the fuel tank to extract escaping fuel fumes. If no exhaust extraction system is available, a radial fan (as long as motor is not in air flow) with a displacement greater than 15 m³/h can be used.
- ♦ Prevent fuel from contacting the skin. Wear fuel-resistant gloves!

When servicing the engine control module (ECM), it may be necessary to use a heat gun. The heat gun, shear bolts, and parts of the protective housing will become extremely hot. Use extreme caution when working with or handling these parts to avoid personal injury.

Observe operating instructions when working with a heat gun. To prevent damage (burning) to the wiring and harness connections, insulation and the electronic components, perform outlined work steps exactly!

The cooling system is under pressure. To avoid scalding, use caution when opening the cooling system and servicing cooling system components!



Caution

The battery must only be disconnected and connected with the ignition switched off. Otherwise, the engine control module (ECM) can be damaged.

The use of nails, paper clips, or another unauthorized materials to back-probe electrical harness connectors is strictly prohibited and may cause damage to the electrical harness connectors, terminal ends or to a component. Use only the manufacturers test lead kit or an equivalent aftermarket test lead kit for back-probing all electrical harness connectors.

Do not use sealants containing silicone. Particles of silicone drawn into the engine, will not be burnt in the engine and will damage the oxygen sensors.

Secure all hose connections with the correct hose clips (the same as original equipment).

If engine is to be cranked without starting, for example as part of a compression test, remove the fuses for the voltage supply of Ignition Coils and the fuel injector.

An electrostatic charge can lead to functional problems of electrical components of the engine, transmission and selector lever mechanism. Touch a grounded object, e.g. a water pipe or a hoist, before working on electrical components.

Do not make direct contact with electrical harness connector terminals.

Use only gold-plated terminals when servicing any component with gold-plated electrical harness connector terminals.

Even minor contaminations can lead to malfunctions in the fuel injection system. When working on the fuel supply/injection system, pay careful attention to the following rules of cleanliness:

1.3

California OBD-II applies to all gasoline engine vehicles up to 14,000 lbs. Gross Vehicle Weight Rating (GVWR) starting in the 1996 MY and all diesel engine vehicles up to 14,000 lbs. GVWR starting in the 1997 MY.

Several states in the northeastern United States have chosen to adopt the California emission regulations starting in the 1998 MY and are known as "Green States".

Green States receive California-certified vehicles for passenger cars and light trucks up to 6,000 lbs. GVWR. Starting in the 2004 MY, Federal vehicle over 8,500 lbs. will start phasing in OBD-II.

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In Working Conditions

aminations can lead to malfunctions in In. When working on the fuel supply/injectic.
Aful attention to the following rules of cleanlines.

Jhly clean all connections and the surrounding area disconnecting.

e removed parts on a clean surface and cover. Use lintacions.

Jarefully cover over opened components or seal, if repairs are not performed immediately.

When the system is open, do not work with compressed air. Do not move vehicle unless absolutely necessary.

stall clean components: Remove replacement parts immesly prior to installation. Do not use parts that have been 1 unpacked (e.g. in tool boxes etc.).

d electrical connectors: Protect from dirt and moissure connections are dry when reconnecting.

Soard Diagnostic Systems

less to all gasoline engine vehicles up to lewight Rating (GVWR) starting in the gine vehicles up to 14,000 lbs. GVWR

and United States have chosen to valations starting in the 2004 art phasing in OBD-II.

duty passenger velocations are dry when reconnecting in the lappies to all starting in Starting in 2004 MY, gasoline-fueled medium duty passenger vehicles are required to have OBD-II. Federal OBD-II applies to all gasoline engine vehicles up to 8,500 lbs. GVWR starting in the 1996 MY and all diesel engine vehicles up to 8,500 lbs. GVWR starting in the 1997 MY.

OBD-II system implementation and operation is described in the remainder of this document.

1.4

If the engine control module (ECM) recognizes a malfunction that leads to increased emission values, it indicates them by illuminating the malfunction indicator lamp (MIL) which is located in the instrument cluster.

The ECM switches on the MIL after the ignition is switched on. Shortly after the engine is started, the MIL goes out if the ECM does not detect a malfunction that increases the emission values.

If the ECM recognizes a malfunction that leads to increased emissions during the operation of the engine, the ECM switches on the MIL and an entry is stored in the DTC memory of the ECM.

1.5 Controller Area Network Data Link

The engine control module (ECM) communicates with data bus capable control modules via a CAN Data Link.

The data bus capable control modules are connected via data bus wires, which are twisted together (CAN high and CAN low), and exchange information with the ECM. Missing or implausible information on the data bus is recognized and stored as a malfunction based on specific DTC criteria.

The malfunction indicator lamp (MIL) is illuminated as a result of a CAN message sent by the ECM. The MIL can be turned on, turned off, or blink, depending on the message received.

Electronic Power Control Warning Lamp

The engine control module (ECM) monitors electronic power control (EPC) components when the ignition is switched on.

DA negeweaklov Vedrago of into washing the connectness of If a malfunction is recognized in the EPC system, the ECM switches on the EPC warning lamp, which is located in the instrument cluster, and an entry is stored in the DTC memory of the Commercial purposes, in part or in whole of commercial purposes, in part or in whole or commercial purposes. ECM_₹



- escription and Operation

 Supply System", page 6
 aporative Emission System", page 5
 Electronic Engine Power Control", page 7

 4 Fuel Injection System", page 7

 2.5 Engine Control Module*, page 37

 2.12 Exhaust System Components*, page 7

 2.12 Ignition System", page 8

 2.3 Automatic Transmission*, page 8

 4 for technical bulletins that may supersede any information
 4 in this manual.

 4 safety precautions:

 4 Precautions*, page 2

 4 ing conditions:

 4 page 4

 4 tools as well as common tools may and an analytic part number. These tools may and attermarket tool or are available and a tool use or in the same a

The evaporative emission system has been designed to minimize the release of hydrocarbons from the fuel system into the atmosphere. The evaporative system components all work together with the ECM to prevent fuel vapor from escaping and route it to the intake manifold to be burned during normal combustion.

The leak detection system checks the integrity of the evaporative emission system by pressurizing system.

- When leak detection is activated, a pump pressurizes the evaporative system.
- During the leak diagnosis, the system is monitored for a specific time period. If the pressure does not drop a specific amount during the time period, the system is considered to be sealed.
- If the pressure drops greater than a specified amount during a specific time period, the system is pressurized once more. The engine control module measures the time until the pressure drops again. The control module uses the measured value to determine the size of the leak.

fuel consumption under certain load conditions.

It would be incorrect to think that EPC consists of only one or two components. EPC is much more of a system containing all components that contribute to recognizing, controlling and monitoring the position of the throttle valve.

2.4 **Fuel Injection System**

For all fuel injection system component locations, removal/installation procedures and torque specifications, refer to the service manual.

2.5 **Engine Control Module**

The ECM regulates fuel injection, throttle valve control module, oxygen sensor regulation, ignition, knock control, evaporative emission purge valve, engine speed limitation through the fuel injectors or the power supply relay, as well as OBD functions.

Exhaust System Components

For all exhaust system, emission control component locations, removal/installation procedures and torque specifications, refer to the service manual.



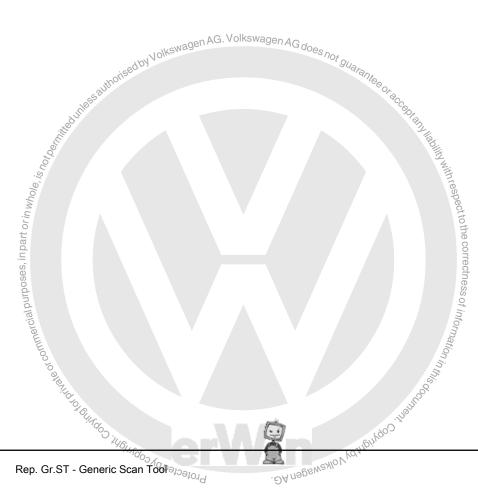
Ignition System 2.7

For all ignition and glow plug system component locations, removal/installation procedures and torque specifications, refer to the service manual.

Automatic Transmission 2.8

The transmission control module receives information from transmission related components and uses this information to control shifting and operation of the transmission.

For all automatic transmission component locations, removal/installation procedures and torque specifications, refer to the service manual.



3 Diagnosis and Testing

- ⇒ "3.1 Preliminary Check", page 9
- ⇒ "3.2 Readiness Code", page 9
- ⇒ "3.3 Diagnostic Modes 01 09", page 11
- ⇒ "3.4 Engine DTC Tables", page 29
- ⇒ "3.5 Transmission DTC Tables", page 105
- ⇒ "3.6 Diagnostic Procedures", page 151

3.1 Preliminary Check

Prior to component diagnosis, a preliminary check must be performed.

Check the technical bulletins for information that may supersede any information included in this manual.

- Connect the scan tool.
- Switch the ignition on.
- Using the scan tool, check for any stored or related DTCs.

If other DTCs are stored:

Repair these DTCs first before performing the following procedure.

If no other DTCs are stored:

- rming the following pro
 rming the following pro
 memory. Refer to
 Memory", Using the scan tool, erase the DTC memory. Refer to ⇒ "3.3.4 Diagnostic Mode 04.> Erase DTC Memory", <u>page 15</u> .
- Perform a road test to attempt to duplicate the customers complaint.

If the DTC returns:

Perform the diagnostic procedure.

If the DTC does not return:

- The fault is intermittent or a sporadic condition may exist.
- Check the suspected component, electrical harness and electrical harness connectors for damage, corrosion, loose or broken terminals.
- If necessary, repair the faulty wiring connection.
- Perform a road test to verify the repair.

If the DTC returns:

Perform the diagnostic procedure.

If the DTC does not return.

The fault may have been the result of a loose electrical connection.

Generate readiness code. Refer to Google Padiness Code", page 9.

3.2 Readiness Code

Readiness code description

Diagnostics are performed at regular intervals during normal vehicle operation. After repairing an emissions related system, a readiness code is generated by road testing the vehicle.



If a malfunction is recognized during the drive cycle, it will be stored in the DTC memory.

The OBD drive cycle operation will be monitored with a hand held diagnostic tool. Consult the manufacturer's instruction manual for correct tool operation.

The readiness code is erased every time the DTC memory is erased or any time the battery is disconnected. If the DTC memory has been erased or the battery is disconnected, a new readiness code must be generated.

Only erase the DTC memory if a DTC has been stored.

General recommendations

Most monitors will complete easier and quicker using a "steadyfoot" and "smooth" acceleration during the drive cycle operation, cruise, and acceleration modes.

Operating conditions

For the EVAP monitor test, the coolant temperature and the ambient air temperature must be between 10° C and 35° C with a difference between them no greater than 4° C. The ambient air temperature must not change more than 4° C during the drive cycle procedure (e.g. when driving out of a heated workshop in the winter).

Test requirements

- · Erase the DTC memory.
- Coolant temperature must be between 80° C and 110° C.
- The intake air temperature must be between 10° C and 35° C.
- Battery voltage must be a minimum of 12.5 volts.
- Fuel tank level 1/4 to 3/4 full.

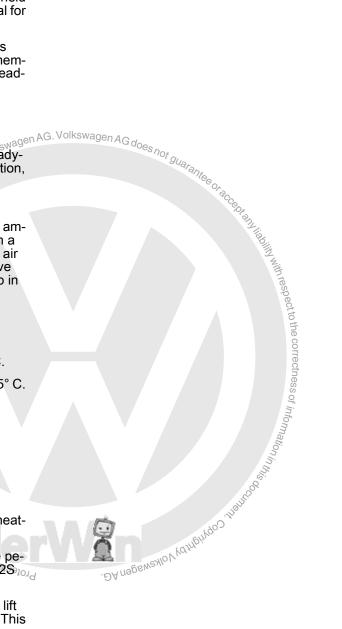
Drive Cycle Procedure

- Connect the scan tool.
- Switch the ignition on and start the vehicle.
- Idle the vehicle for 2-3 minutes. This executes the HO2S heater, misfire, fuel trim, and purge system monitors.
- Drive the vehicle at 45-55 mph for a continuous 7 minute period avoid stopping. This executes the evaporative, HO2S_{101,01} sensor, fuel trim, and misfire monitors.
- Accelerate the vehicle to an engine speed of 5000 RPM; lift off the throttle until the engine speed is around 1200 rpm. This executes the fuel cut off.
- Accelerate the vehicle smoothly to 60-65 mph, cruise constantly for 5 min, this executes the catalyst; HO2S sensor, misfire, fuel trim, and purge system monitors.
- Decelerate and idle the vehicle again for 3 minutes. This executes the misfire, fuel trim, and purge system monitors.
- Check the status of the readiness code.



Note

Depending on the scan tool used. The readiness code status may be displayed as complete, passed or OK.



If any engine monitor fails the drive cycle test. Repeat the drive cycle test until all engine monitors have successfully run through and passed.



Note

When repeating the drive cycle operation for a failed evaporative or thermostat monitor, allow the engine to cool until the coolant temperature and the ambient air temperature are be between 10° C and 35° C with a difference no greater than 4° C and repeat the drive cycle operation.

If the drive cycle operation fails again.

Check the DTC memory for stored DTCs.

Repair the vehicle if necessary.

- Repeat the drive cycle operation until all engine monitors have successfully run through and passed.
- Remove the scan tool and switch the ignition off.

3.3 Diagnostic Modes 01 - 09

The information provided in Modes 01 through 09 displays the various levels of emission related data that may be monitored, as well as the ability to retrieve and read stored DTC trouble codes, erase stored DTC trouble codes, generate readiness codes, and select the various PIDs and Test-IDs used within the modes to monitor the engine, and emission related component parameters.



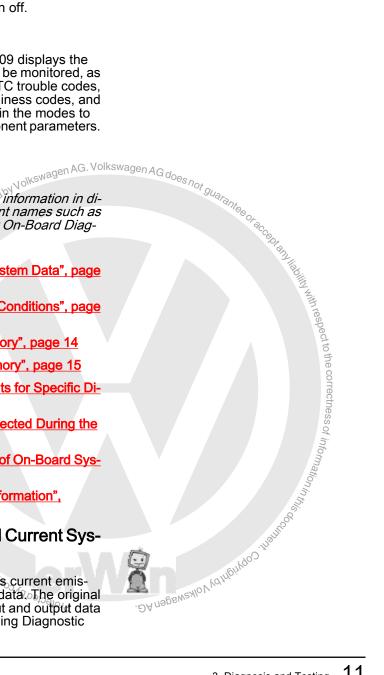
Note

Depending on scan tool and protocol used, the information in diagnostic mode 01 may be referred to by different names such as Test-ID (TID), Hex-ID, Component-ID (CID), or On-Board Diagnostic Monitor Identifier (OBDMID).

- <u> 3.3.1 Diagnostic Mode 01 Read Current System Data", page</u>
- 3.2 Diagnostic Mode 02 Read Operating Conditions", page
- ⇒ "3.3.3 Diagnostic Mode 03:- Read DTC Memory", page 14
- ⇒ "3.3.4 Diagnostic Mode 04 Erase DTC Memory", page 15
- ⇒ "3.3.5 Diagnostic Mode 06 Read Test Results for Specific Diagnostic Functions", page 16
- ⇒ "3.3.6 Diagnostic Mode 07 Read Faults Detected During the Current or Last Driving Cycle", page 26
- ⇒ "3.3.7 Diagnostic Mode 08 Request Control of On-Board System, Test or Component", page 26
- ⇒ "3.3.8 Diagnostic Mode 09 Read Vehicle Information", page 27

Diagnostic Mode 01 - Read Current Sys-3.3.1 tem Data

Diagnostic Mode 01 makes it possible to access current emissions-related measured values and diagnostic data. The original measured values (no replacement values), input and output data and system status information are displayed using Diagnostic Mode 1.



Test requirement

Coolant temperature at least 80 °C.

Procedure

- Connect the scan tool.
- Start the engine and run at idle.
- Select "Diagnostic Mode 1: Obtain data.".
- From the following table, select the desired the "PID" that is to be monitored, e.g. "PID \$05 Coolant temperature".

The current values of the component or system that is being monitored will be displayed on the scan tool screen.

PID	Component or System
\$01:	Monitoring status since erasing DTC memory
\$03:	Condition of fuel system
\$04:	Calculated load value
\$05:	Coolant temperature
\$06:	Short term air fuel ratio
\$07:	Long term air fuel ratio
\$0C:	Engine RPM
\$0D:	Vehicle speed
\$0E:	Ignition timing advance for #1 cylinder
\$0F:	Intake air temperature
\$10:	Air flow rate from mass air flow sensor
\$11:	Absolute throttle position
\$13:	Oxygen Sensor Bank 1 Sensor 1
\$15:	Oxygen Sensor Bank 1 Sensor 2
\$16:	Oxygen Sensor Bank 1 Sensor 3
\$1C	QBD Requirements
\$1F:	Time since engine start
\$21:	Distance driven with MIL ON
\$23:	Fuel rail pressure
\$2E:	Commanded evap purge
\$30:	Warm up counts after MIL erased
\$31:	Distance driven after erasing DTC memory
\$33:	Barometric pressure
\$34:	Heater current Bank 1 Sensor 1
\$3C:	Calculated catalyst temperature
\$41:	Monitor status current drive cycle
\$42:	Control module voltage
\$43:	Absolute load value
\$44:	Specified value of oxygen sensor signal
\$45:	Relative throttle valve position
\$46:	Ambient temperature
\$47:	Throttle valve position 2 absolute
\$49:	Accelerator pedal position 1 absolute
\$4A:	Accelerator pedal position 2 absolute
\$4C:	Specified throttle valve position
\$51	Fuel type

PID	Component or System
\$56:	Offset oxygen sensor regulation after catalytic convertor

Switch the ignition off.

3.3.2 Diagnostic Mode 02 - Read Operating **Conditions**

When an emissions-related fault (pending DTC, visible in mode 07) is first detected, operating conditions are stored. Mode 02 makes it possible to access this freeze frame data as soon as this fault is shown in mode 03. Each control module only shows freeze frame data for one fault via mode 02. Therefore, there are two priority levels. If there is a malfunction with higher priority, the freeze frame data is overwritten.

- Fault with higher priority: Misfire malfunction or fuel trim malfunction.
- Fault with normal priority: All other emissions-related faults.



Note

Procedure

- Connect the scan tool.
- Start the engine and run at idle.



Note

- Select "Diagnostic Mode 2: Obtain operating conditions.".
- From the following table, select the desired the "PID", e.g. "PID \$05 Coolant temperature that is to be monitored.

agnostic mode 02 may be re	protocol used, the information in di- ferred to by different names such as ponent-ID (CID), or On-Board Diag- DMID).
Procedure	
 Connect the scan tool. 	agen AG. Volkswagen AG.
- Start the engine and run	at idle.
Note	ed unless authorise of acted the state of acted the
If the engine does not start, least 5 seconds, do not swite	crank the engine using starter for at chities ignition off afterward.
- Select "Diagnostic Mode	2: Obtain operating conditions.".
- From the following table, s	elect the desired the "PID", e.g. "PID
\$05 Coolant temperature	that is to be monitored.
	mponent or system that is being to the scan tool screen.
The current values of the co	mponent or system that is being on the scan tool screen. Component or System Component or System
The current values of the comonitored will be displayed	Component or System Component or System DTC which triggered Freeze Frame data
The current values of the commonitored will be displayed PID	DTC which triggered Freeze Frame data Fuel system status
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The current values of the commonitored will be displayed a solution of the commonitored will be displayed as solu	DTC which triggered Freeze Frame data Fuel system status Calculated load value Coolant temperature Short term air fuel ratio Long term air fuel ratio Engine RPM Vehicle speed
PID \$02: \$03: \$04: \$05: \$06: \$07: \$0C:	DTC which triggered Freeze Frame data Fuel system status Calculated load value Coolant temperature Short term air fuel ratio Long term air fuel ratio Engine RPM Vehicle speed
The current values of the commonitored will be displayed a solution of the commonitored will be displayed as solut	DTC which triggered Freeze Frame data Fuel system status Calculated load value Coolant temperature Short term air fuel ratio Long term air fuel ratio Engine RPM Vehicle speed

PID	Component or System	
\$11:	Throttle valve position 1 absolute	
\$1F:	Time since engine start	
\$23:	Fuel rail pressure	
\$2E:	Commanded evap purge	
\$33:	Barometric pressure	
\$42:	Control module voltage	
\$43:	Absolute load value	
\$44:	Commanded equivalence ratio	
\$45:	Relative throttle valve position	
\$46:	Ambient temperature	
\$47:	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
\$49:	Accelerator pedal position 1 absolute	9,
\$4A:	Accelerator pedal position 2 absolute	Copy
\$4C:	Specified throttle valve position	131 /s
\$51	Fuel type	TO HE
\$56:	Offset oxygen sensor regulation after catalytic convertor	With
Diagnostic Mode 03 makes it faults (confirmed DTCs: faults the ECM and in the TCM. When the ECM recognizes at the malfunction indicator lamp is recognized, the ECM turns warning lamp. Both are located The DTCs are sorted by SAE of a 5 digit alpha numeric value. Note Depending on scan tool and	code with the DTC tables consisting	ot to the correctness of $information$ in $this ook, the correctness of information in this ook, the correctness of the cor$
DTC code.	a breakdown and explanation of the	
P-Codes		

3.3.3 Diagnostic Mode 03 - Read DTC Memory



Note

P-Codes

Comp	oonent gr	oup				
P x x x DTC for the drivetrain						
Norm	n-Code	•	•	•	·	
Р	0	х	х	х	Trouble codes defined by SAE with specified malfunction texts	
Р	1	х	х	х	Additional emission relevant DTCs provided by the manufacturer	
Р	2	х	х	х	DTCs defined by SAE with specified texts, from MY 2000	
Р	3	х	х	х	Additional emission relevant DTCs provided by the manufacturer from MY 2000	

Com	ponent	group						
Repa	air group)						
Р	х	0	0 x x Fuel and air mixture and additional emission regulations					
Р	x	1	х	x	Fuel and air ratios			
Р	х	2	х	x	Fuel and air ratios			
Р	х	3	х	х	Ignition system			
Р	х	4	х	x	Additional exhaust system			
Р	х	5	х	x	Speed and idle control			
Р	х	6	х	х	Control module and output signals			
Р	х	7	х	x	Transmission			
Р	х	8	х	x	Transmission			
Р	х	9	х	х	Control modules, input and output signals			
U-Codes U-Codes								
U-Co	J-Codes authorities and a second seco							

U-Codes

Compo	nent gro	up	105	5	**RCLORE
U	x	х	X xedui	x	DTC for network (CAN bus)
Norm-0	Code	-	Orn		la l
U	0	X S	×	x	Trouble codes defined by SAE with specified malfunction texts

Procedure

- Connect the scan tool.
- Switch the ignition to the ON position.
- Select Diagnostic Mode 03: Interrogating fault memory.
- The stored DTC or DTCs will be displayed on the scan tool

The following table is an example of the DTC information that may be displayed on the scan tool screen:

Indication example	Explanation
P0444	SAE Diagnostic Trouble Code
Evaporative emission canister purge regulator valve	Malfunctioning wiring path or malfunctioning component
Circuit open	Malfunction type as next

- Refer to the DTC tables for the diagnostic repair procedures.
- Switch the ignition off.

3.3.4 Diagnostic Mode 04 - Erase DTC Memory

Diagnostic Mode 04 makes it possible to erase the DTC memory and to reset all emissions-related diagnostic data. In that way, all faults in the DTC memory in the ECM and TCM are erased. The adaptation values may also be reset.

Emissions-related diagnostic data includes (as applicable):



- MIL Status
- ◆ Number of DTCs
- Readiness bits
- Confirmed DTCs
- Pending DTCs
- ◆ DTC that belongs to freeze frame
- Freeze frame data
- ◆ Test results of specific diagnostic functions
- ◆ Distance driven with "MIL ON"
- Number of warm-up cycles after erasing the DTC memory
- ◆ Distance driven after erasing the DTC memory
- ◆ Misfire counter



Note

Depending on scan tool and protocol used, diagnostic mode 04 and the information provided may be referred to by a different name.

Procedure

- Connect the scan tool.
- Switch the ignition on.
- Select Diagnostic Mode 03: Interrogating fault memory.
- Then select Mode 4: Reset/delete diagnostic data.

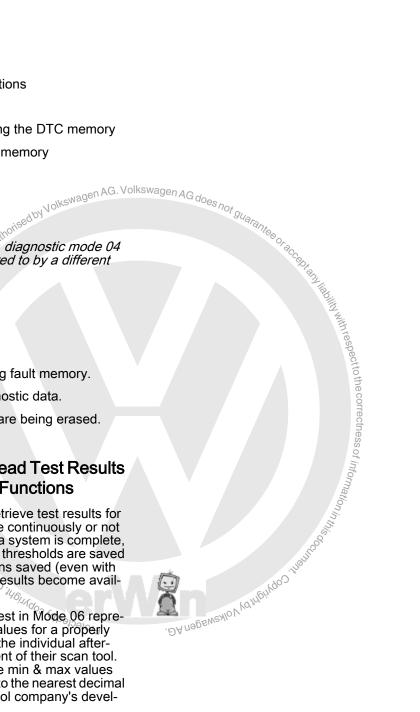
The scan tool will display: Diagnostic data are being erased.

- Switch the ignition off.

3.3.5 Diagnostic Mode 06 - Read Test Results for Specific Diagnostic Functions

Diagnostic Mode 06 makes it possible to retrieve test results for special components and systems which are continuously or not continuously monitored. If the diagnosis of a system is complete, the diagnostic result and the corresponding thresholds are saved and displayed in mode 06. This data remains saved (even with the ignition off) until either new diagnostic results become available or the DTC memory is erased.

The min & max values for each individual test in Mode 06 represent the minimum & maximum operating values for a properly operating system. This data is provided to the individual aftermarket scan tool companies for development of their scan tool. Depending on the scan tool being used, the min & max values shown may vary, or be rounded up or down to the nearest decimal point depending on the aftermarket scan tool company's development process. e.g.:



	Minimum Value
GST manual documentation	0.3499
Aftermarket scan tool display	0.35



Note

Depending on the scan tool and protocol used, the information displayed in diagnostic mode 06 may be referred to by different names such as Test-ID (TID), Hex-ID, Component-ID (CID), or On-Board Diagnostic Monitor Identifier (OBDMID).

Test requirements

- Exhaust system must be properly sealed between the catalytic converter and the cylinder heads.
- No DTCs stored in the DTC memory.
- Coolant temperature at least 80 °C.

Work procedure

- Connect the scan tool.
- Start the engine and let run at idle speed.
- Select Mode 6: Check test the results of components that are not continuously monitored.

Select the desired Test-ID..

The current minimum and maximum values will be displayed on the scan tool screen.

The following table is a numerical list of all "Test-IDs" that may be selected.

Lawswagen AG. Volkswagen AG does
Component or System 10t gu
Oxygen Sensor Monitor Bank 1 - Sensor 1
Qxygen Sensor Monitor Bank 1 - Sensor 2
Oxygen Sensor Monitor Bank 1 - Sensor 3
Catalytic Converter Monitoring
Camshaft Adjustment / VVT Bank 1
Fuel Tank EVAP System Integrity/Leak Test (0.90")
Fuel Tank EVAP System Integrity/Leak Test (0.40/1.0 mm)
Fuel Tank EVAP System Integrity/Leak Test (0.20/0.5 mm)
EVAP Valve Function Check
Oxygen Sensor Heater Monitor Bank 1 - Sensor 1
Oxygen Sensor Heater Monitor Bank 1 - Sensor 2
Oxygen Sensor Heater Monitor Bank 1 - Sensor 3
Mis-Fire Cylinder 1 Data
Mis-Fire Cylinder 2 Data
Mis-Fire Cylinder 3 Data
Mis-Fire Cylinder 4 Data

Monitor-ID \$01: Oxygen Sensor Monitor Bank 1 - Sensor 1

- Connect the scan tool.
- Start the engine and run at idle.
- Protected by copyrigh Select "Mode 6: Check test the results of components that are not continuously monitored".

Select "Monitor-ID \$01".



AG Volkswagen

- Select the desired "Test-ID".
- Check specified values at idle.

Check spe	cified valu	ues at idle.	orised by		⁹ ⁹ Uarante	
Test-ID	DTC	Component or System	Min.	Max.	A 1 1141 1 1 6 41 0/2	
\$83	P0133	Response Check Bank 1 Senso	or 1. 0.250	V 1.999 V	Refer to DTC P0133 in the DTC summary table. ⇒ page 40.	OP BAZ
\$84	P2195 P2196	Front to rear rationality Bank 1 S sor 1.	Sen0.086 V	0.080 V	Refer to DTC P2195 ⇒ page 90 P2196 ⇒ page 90 in the DTC summary table.	tywith respec
\$89	P0133	Signal dynamic Bank 1 Sensor	1. 0.250	V 1.999 V	Refer to DTC P0133 in the DTC summary table. ⇒ page 40.	t to the cor
repair proc ⇒ "3.3.3 Di page 14 . Switch the	cedure iagnostic l ignition o	ed DTC's or the corresponding dia Mode 03 - Read DTC Memory", ff. n Sensor Monitor Bank 1- Sensor			Refer to DTC P0133 in the DTC summary table. ⇒ page 40 . Refer to DTC P2195 ⇒ page 90 P2196 ⇒ page 90 in the DTC summary table. Refer to DTC P0133 in the DTC summary table. ⇒ page 40 .	mation in this oo out of the state of the st
Connect th	ne scan to	ol.	20.1110		Contract Cooperation of the Coop	
Start the e	ngine and	I run at idle.	ODYTION	eri	To Wo Ved trips	
Select "Mo		ck test the results of components nitored".	s that are	Protecte	.DA nageway.	
elect "Monito	or-ID \$02"					
Select the	desired "7	Гest-ID".				
Check spe	cified valu	ues at idle.				
Test-ID	DTC	Component or System	Min.	Max.	Additional Information]

nisedby Volkswagen AG. Volkswagen AG does not guarante

- If any of components or systems fail to meet the specified values. Refer to Diagnostic "Mode 03: Interrogating Fault Memory" to check for stored DTC's or the corresponding diagnostic repair procedure
 - ⇒ "3.3.3 Diagnostic Mode 03 Read DTC Memory", page 14 .
- Switch the ignition off.

Monitor-ID \$02: Oxygen Sensor Monitor Bank 1- Sensor 2

- Connect the scan tool.
- Start the engine and run at idle.
- Protected by copyright, Select "Mode 6: Check test the results of components that are not continuously monitored".

Select "Monitor-ID \$02".

- Select the desired "Test-ID".
- Check specified values at idle.

Test-ID	DTC	Component or System	Min.	Max.	Additional Information
\$05	P013A	Oxygen Sensor Transient Time rich-lean Bank 1 - Sensor 2	0 s	0.650 s	Refer to DTC P013A in the DTC summary table. ⇒ page 42
\$06	P013B	Oxygen Sensor Transient Time lean-rich Bank 1 - Sensor 2	0 s	1.50 s	Refer to DTC P013B in the DTC summary table. ⇒ page 43
\$81	P2271	Output Voltage rich during decel.	0 V	0.8018 V	Refer to DTC P2271 in the DTC summary table. ⇒ page 92
\$82	P2270	Output Voltage lean during accel.	0.5980 V	1.1306 V	Refer to DTC P2270 in the DTC summary table. ⇒ page 92
\$8A	P2271	Deceleration test response time.	0 V	0.1495 V	Refer to DTC P2271 in the DTC summary table. ⇒ page 92
\$8C	P013E	Oxygen Sensor Delay Time rich-lean Bank 1 - Sensor 2	0 s	0.650 s	Refer to DTC P013E in the DTC summary table. ⇒ page 44
\$8D	P013F	Oxygen Sensor Delay Time lean-rich Bank 1 - Sensor 2	0 s	1.50 s	Refer to DTC P013F in the DTC summary table. ⇒ page 46
\$8E	P2270	Oxygen Sensor Maximum Oscillation Voltage	0.75200 V	7.99 V	Refer to DTC P2270 in the DTC summary table. ⇒ page 92



Test-ID	DTC	Component or System	Min.	Max.	Additional Information			
\$8F	P2271	Oxygen Sensor Minimum Oscillation Voltage	0 V	0.15100 V	Refer to DTC P2271 in the DTC summary table. ⇒ page 92			
 If any of coues. Referory" to cherepair proces	If any of components or systems fail to meet the specified values. Refer to Diagnostic "Mode 03: Interrogating Fault Memory" to check for stored DTC's or the corresponding diagnostic repair procedure ⇒ "3.3.3 Diagnostic Mode 03 - Read DTC Memory" kswagen AG does not page 14. Switch the ignition off. conitor-ID \$03: Oxygen Sensor Monitor Bank 1 - Sensor 3 Connect the scan tool Start the engine and run at idle. Select "Mode 6: Check test the results of components that are not continuously monitored". Select "Monitor-ID \$03". Select the desired "Test-ID". Check specified values at idle.							
- Switch the	ignition o	off. "Molisea E		darante.)_			
Monitor-ID \$0	3: Oxyge	n Sensor Monitor Bank 1 - Senso	or 3		Oracco			
- Connect th	ne scan to	ool grin.			Or any			
- Start the e	ngine and	run at idle.			leb li			
 Select "Mo not continue" 	de 6: Che lously mo	eck test the results of components onitored".	that are		SWITH TO			
Select "Monito	Select "Monitor-ID \$03".							
 Select the 	Select the desired "Test-ID".							
 Check spe 	Check specified values at idle.							
Test-ID	DTC	Component or System	Min.	Max.	Additional Information			

Monitor-ID \$03: Oxygen Sensor Monitor Bank 1 - Sensor 3

Select "Monitor-ID \$03".

Test-ID	DTC	Component or System	Min.	Max.	Additional Information
\$05	POId 45	Deceleration test - HO2S transient time. Bank 1 Sensor 3	0 m/ Sec.	1.200 s	Refer to DTC P0145 in the DTC summary table. ⇒ page 49
\$81	P2275	Output Voltage rich during decel.	0 V	0.8018 V	Refer to DTC P2275 in the DTC summary table. ⇒ page 93
\$82	P2274 [*]	Output Voltage lean during accel.	0.5980 V	1.1306 V	Refer to DTC P2274 in the DTC summary table. ⇒ page 92
\$8A	P2275	Deceleration test response time.	0:000 V	0.1495 V _{KON}	Refer to DTC P2275 in the DTC summary table. ⇒ page 93
\$8E	P2274	Maximum Oscillation Bank 1 Sensor 3	.Đ A Ag _{De.}	0.1495 V	Refer to DTC P2274 in the DTC summary table. ⇒ page 92
\$8F	P2275	Minimum Oscillation Bank 1 Sensor 3	0 V	0.1495 V	Refer to DTC P2275 in the DTC summary table. ⇒ page 93

- If any of components or systems fail to meet the specified values. Refer to Diagnostic "Mode 03: Interrogating Fault Memory" to check for stored DTC's or the corresponding diagnostic repair procedure "3.3.3 Diagnostic Mode 03 - Read DTC Memory",
- Switch the ignition off.

<u>page 14</u> .

Monitor-ID \$21: Catalytic Converter Monitoring

- Connect the scan tool.
- Start the engine and run at idle.
- Select "Mode 6: Check test the results of components that are not continuously monitored".



Select "Monitor-ID 21".

- Select the desired "Test-ID".
- Check specified values at idle.

Gene	eric Sca	11 1001 - Euilloff 11.2014	anolis.		4/1/ ₆				
Select "Monito	 or-ID 21	".	255 Autr			Oraccer.			
- Select the	desired	"Test-ID".				NI BOY			
- Check specified values at idle.									
Test-ID	DTC	Component or System	Min.	Max.	Additional Information	With			
\$84	P0420	Catalytic converter monitoring Bank 1.	1.00	19.988	Refer to DTC P0420 in the DTC summary table. ⇒ page 65.	especttotr			
	•	part				1eco			
Select "Monitor-ID 21". Select the desired "Test-ID". Check specified values at idle. Test-ID DTC Component or System Min. Max. Additional Information									
- Switch the	ignition	off.				ninth			
Monitor-ID \$3	5: Cams	shaft Adjustment / I V V T Bank	1			2008.			
 Connect th 	ne scan	tool.	Eur			Jugui			
- Start the e	ngine ar	nd run at idle.	. Copin		Q GUN	CO.			
- Select "Mo not continu	de 6: Ch Jously m	nd run at idle. neck test the results of componer nonitored".	nts that are	Protectedby	DA NO BENEALO VOIND.				
Select "Monitor-ID 21".									
- Select the	desired	"Test-ID".							
- Check spe	cified va	alues at idle.							
Test-ID	DTC	Component or System	Min.	Max.	Additional Information				
\$80	P0011	V V T specified position not	-32° KW	28° KW	Refer to DTC P0011 in the				

Monitor-ID \$35: Camshaft Adjustment / I V V T Bank 1

- Connect the scan tool.
- Start the engine and run at idle.
- Start the engine and run across.

 Select "Mode 6: Check test the results of components that are appropriate monitored".



- Select the desired "Test-ID".
- Check specified values at idle.

Test-ID	DTC	Component or System	Min.	Max.	Additional Information
\$80	P0011	V V T specified position not reached.	-32° KW	28° KW	Refer to DTC P0011 in the DTC summary table. ⇒ page 29
\$81	P000 A	V V T specified position is reached too slow.	-32° KW		Refer to DTC P000A in the DTC summary table. ⇒ page 29

- If any of components or systems fail to meet the specified values. Refer to Diagnostic "Mode 03: Interrogating Fault Memory" to check for stored DTC's or the corresponding diagnostic repair procedure
 - <u> "3.3.3 Diagnostic Mode 03 Read DTC Memory",</u> page 14
- Switch the ignition off.

Monitor-ID \$3A: Fuel Tank EVAP System Integrity/Leak Test (0.90")

- Connect the scan tool.
- Start the engine and run at idle.
- Select "Mode 6: Check test the results of components that are not continuously monitored".

Select "Monitor-ID 3A".

- Select the desired "Test-ID".
- Check specified values at idle.



Test-ID	DTC	Component or System	Min.	Max.	Additional Information
\$81	P0455	Tank leak test: Large leak.	950 s	Sec	Refer to DTC P0455 in the DTC summary table. ⇒ page 68.

- If any of components or systems fail to meet the specified values. Refer to Diagnostic "Mode 03: Interrogating Fault Memory" to check for stored DTC's or the corresponding diagnostic repair procedure
 - ⇒ "3.3.3 Diagnostic Mode 03 Read DTC Memory", page 14.
- Switch the ignition off.

Monitor-ID \$3B: Fuel Tank EVAP System Integrity/Leak Test (0.40/1.0mm)

- Connect the scan tool.
- Start the engine and run at idle.
- Select "Mode 6: Check test the results of components that are not continuously monitored".

Select "Monitor-ID 3B".

- Select the desired "Test-ID".

Select "Monito	r-ID 3B								
- Select the	 Select the desired "Test-ID". 								
 Check speed 	 Check specified values at idle. 								
Test-ID	DTC	Component or System	Min.	Max.	Additional Information				
\$81	P0442	Fuel Tank Leak Test: Small leak.	1.550 s	65.535 Sec	Refer to DTC P0442 the DTC summary table. ⇒ page 67				
\$86	P0442	Fuel Tank Leak Test: Small leak.	900 Pa	8191.75 Pa	Refer to DTC P0442 the DTC summary table. ⇒ page 67				
		awagen A	kG. Volkswag	gen AG dos					
ues. Refer ory" to chec repair proc ⇒ "3.3.3 Di page 14	\$86 P0442 Fuel Tank Leak Test: Small 900 Pa 8191.75 Pa Brefer to DTC Summary table. page 67 Fuel Tank Leak Test: Small 900 Pa 8191.75 Pa Brefer to DTC P0442 the DTC summary table. page 67 If any of components or systems fail to meet the specified values. Refer to Diagnostic "Mode 03: Interrogating Fault Memory" to check for stored DTC's or the corresponding diagnostic repair procedure "3.3.3 Diagnostic Mode 03: Read DTC Memory", page 14 Switch the ignition off. Monitor-ID \$3C: Fuel Tank EVAP System Integrity/Leak Test (0.20/0.5mm) Connect the scan tool. Start the engine and run at idle. Select "Mode 6: Check test the results of components that are not continuously monitored". Select "Monitor-ID 3C" Select the desired "Test-ID" . Check specified values at idle. Test-ID DTC Component or System Min. Max. Additional Information								
Monitor-ID \$3(0.20/0.5mm)	C: Fuel	Tank EVAP System Integrity/Lea	k Test		Ath resp				
- Connect th	e scan	tool.			ectto				
- Start the er	ngine ar	nd run at idle.			thec				
- Select "Mode 6: Check test the results of components that are not continuously monitored".									
Select "Monitor-ID 3C"									
- Select the desired "Test-ID".									
- Check specified values at idle.									
Test-ID	DTC	Component or System	Min.	Max.	Additional Information				

- Switch the ignition off.

Monitor-ID \$3C: Fuel Tank EVAP System Integrity/Leak Test (0.20/0.5mm)

Select "Monitor-ID 3C"

Test-ID	DTC	Component or System	Min.	Max.	Additional Information
\$81	P045 6	Tank leak test: Pinhole leak (0.5 mm).	4500 mSec.	65535 mSec	Refer to DTG P0456 in the DTC summary table. ⇒ page 69.
		146mg			wando)
		Profedby		JA Nageneylo V	3. Diagnosis and Testing 2



Test-ID	DTC	Component or System	Min.	Max.	Additional Information
\$82		Evap system monitor OK by inivital Purge Test	olks 112 g g n _{A G}	6553.5 g	Pass only.
\$84	P045 6	Tank leak tests Very small leak	0.00000		Refer to DTC P0456 in the DTC summary table. ⇒ page 69 .

- If any of components or systems fail to meet the specified values. Refer to Diagnostic "Mode 03: Interrogating Fault Memory" to check for stored DTC's or the corresponding diagnostic repair procedure
 * "3.3.3 Diagnostic Mode 03 Read DTC Memory".
- Switch the ignition off.

page 14

Monitor-ID \$3D: EVAP Valve Function Check

- Connect the scan tool.
- Start the engine and run at idle.
- Select "Mode 6: Check test the results of components that are not continuously monitored".

Select "Monitor-ID 3D" 5

- Select the desired "Test-ID".
- Check specified values abidle.

Test-ID	DTC	Component or System	Min	Max.	Additional Information
\$80	P044 1	Tank vent valve check from % DTEV: Active test Air balance at idle OK, (Normal operation and short test 70).	. 9A n.	1.999 (1) (1) (1) (1) (1) (1) (1) (1)	Refer to DTC P0441 in the DTC summary table. ⇒ page 66.
\$82		Tank vent valve check from % DTEV: Active test, Oxygen sensor regulator deviating in lean direction (can only test OK), (Normal operation and short test 70).	1	65355	Pass only.
\$88		Purge flow OK by deviation lambda control.	1	65355	Pass only.
\$8C	P044 1	Purge flow monitor valve open	0.0000 mA	4.200 to 14.000 mA	Refer to DTC P0441 in the DTC summary table. ⇒ page 66.
\$8D	P044 1	Purge flow monitor valve closed	0.0000 mA	4.300 to 36.3000 mA	Refer to DTC P0441 in the DTC summary table. ⇒ page 66.

If any of components or systems fail to meet the specified values. Refer to Diagnostic "Mode 03: Interrogating Fault Memory" to check for stored DTC's or the corresponding diagnostic repair procedure
 *3.3.3 Diagnostic Mode 03 - Read DTC Memory", page 14

Switch the ignition off.

Monitor-ID \$41: Oxygen Sensor Heater Monitor Bank 1 - Sensor

- Connect the scan tool.

- Start the engine and run at idle.
- Select "Mode 6: Check test the results of components that are not continuously monitored".

Select "Monitor-ID 41",

- Select the desired Test-ID".
- Check specified values at idle.

Test-ID	DTC	Component or System	Min.	Max.	Additional Information
\$81	poses	Oxygen sensor heating between catalytic converter, diagnosis, Bank 1 Sensor 2 internal resistance test.		4.56 k Ohms	Refer to DTC P0141 in the DTC summary table. ⇒ page 48.
\$85	P0135	Oxygen sensor ceramic temp Bank 1 Sensor 1	715 °C		Refer to DTC P0135 in the DTC summary table. ⇒ page 40

- JA negeweylov Warngingon jrannogen AG. If any of components or systems fail to meet the specified values. Refer to Diagnostic "Mode 03: Interrogating Fault Memory" to check for stored DTC sor the corresponding diagnostic repair procedure ⇒ "3.3.3 Diagnostic Mode 03 Read DTC Memory", Protected by page 14.
- Switch the ignition off.

Monitor-ID \$42: Oxygen Sensor Heater Monitor Bank 1 - Sensor

- Connect the scan tool.
- Start the engine and run at idle.
- Select "Mode 6: Check test the results of components that are not continuously monitored".

Select "Monitor-ID 42".

- Select the desired "Test-ID".
- Check specified values at idle.

Test-ID	DTC	Component or System	Min.	Max.	Additional Information
\$81		Oxygen sensor heating between catalytic converter, diagnosis, Bank 1 Sensor 2 internal resistance test.		5.250 k Ohms	Refer to DTC P0141 in the DTC summary table. ⇒ page 48.

- If any of components or systems fail to meet the specified values. Refer to Diagnostic "Mode 03: Interrogating Fault Memory" to check for stored DTC's or the corresponding diagnostic repair procedure
 - ⇒ "3.3.3 Diagnostic Mode 03 Read DTC Memory", page 14
- Switch the ignition off.

Monitor-ID 43: Oxygen Sensor Heater Monitor Bank 1 - Sensor 3

- Connect the scan tool.
- Start the engine and run at idle.
- Select "Mode 6: Check test the results of components that are not continuously monitored".

Select "Monitor-ID 42".

- Select the desired "Test-ID".
- Check specified values at idle.

Test-ID	DTC	Component or System	Min.	Max.	Additional Information
\$81	P0147	Oxygen sensor heating between catalytic converter, diagnosis, Bank 1 Sensor 2 internal resistance test.		kOhms	Refer to DTC P0141 in the DTC summary table. ⇒ page 48 . or DTC P0147 in the DTC summary table. ⇒ page 49

Monitor-ID \$A2: Mis-Fire Cylinder 1 Data

- Connect the scan tool.
- Start the engine and run at idle.
- Select "Mode 6: Check test the results of components that are not continuously monitored".

Select "Monitor-ID A2".

- Select the desired "Test-ID".
- Check specified values at idle.

- Ma - -	 If any of components or systems fail to meet the specified values. Refer to Diagnostic "Mode 03: Interrogating Fault Memory" to check for stored DTC's or the corresponding diagnostic repair procedure ⇒ "3.3.3 Diagnostic Mode 03 - Read DTC Memory", page 14. Switch the ignition off. Monitor-ID \$A2: Mis-Fire Cylinder 1 Data Connect the scan tool. Start the engine and run at idle. Select "Mode 6: Check test the results of components that are not continuously monitored". 							
Se	elect "Monito	or-ID A	2".	orisedbyVo.	"Tot guarante			
_	Select the	desire	d "Test-ID" .	ss autho.	3).	o o race		
-	Check spec	cified v	values at idle.	Junies		Copy of the control o		
	Test-ID	DTC	Component or System	Min./Max. Values	Additional Information	Z liablii		
	\$0B	P030 1	Misfire cylinder 1, Average value over 10 Driving Cycles.	0 - 65535 (counts)	Refer to DTC P0301 in the DTC summary table. ⇒ page 59	kywithrest		
	\$0C	P030 1	Misfire cylinder 1, in this Driving Cycle.	0 - 65535 (counts)	Refer to DTC P0301 in the DTC summary table. ⇒ page 59	ect to the		
_	Monitor-ID \$A2: Mis-Fire Cylinder 1 Data Connect the scan tool. Start the engine and run at idle. Select "Mode 6 Check test the results of components that are not continuously monitored". Select "Monitor-ID A2". Select the desired "Test-ID". Check specified values at idle. Test-ID DTC Component or System Min./Max. Values Additional Information \$0B P030 Misfire cylinder 1, Average values of counts of the cylinder 1, average value over 10 Driving Cycles. \$0C P030 Misfire cylinder 1, in this Driving 0 - 65535 (counts) Refer to DTC P0301 in the DTC summary table. page 59 . If any of components or systems fail to meet the specified values. Refer to DTC P0301 in the DTC summary table. page 41 . Switch the ignition off. Monitor-ID \$A3: Mis-Fire Cylinder 2 Data Connect the scan tool. Start the engine and run at idle. Select "Monitor-ID A3:". Select "Monitor-ID A3:".							
М		_	Fire Cylinder 2 Data			ing 8 s.		
_	Monitor-ID \$A3: Mis-Fire Cylinder 2 Data — Connect the scan tool.							
_	- Start the engine and run at idle.							
_	 Switch the ignition off. Monitor-ID \$A3: Mis-Fire Cylinder 2 Data Connect the scan tool. Start the engine and run at idle. Select "Mode 6 Check test the results of components that are not continuously monitored". Select "Monitor-ID A3:". 							
Se	elect "Monito	or-ID A	3:".					
_	Select the	desire	d "Test-ID" .					
-	Check spe	cified v	values at idle.					

- If any of components or systems fail to meet the specified values. Refer to Diagnostic "Mode 03: Interrogating Fault Memory" to check for stored DTC's or the corresponding diagnostic repair procedure
 - "3.3.3 Diagnostic Mode 03 Read DTC Memory", page 14.
- Switch the ignition off.

Monitor-ID \$A3: Mis-Fire Cylinder 2 Data

- Connect the scan tool.
- Start the engine and run at idle.
- Profeshory of Bridge of Brigging of Briggi Select "Mode 6 Check test the results of components that are not continuously monitored".

Select "Monitor-ID A3:".

- Select the desired "Test-ID".
- Check specified values at idle.





Test-ID	DTC	Component or System	Min./Max. Values	Additional Information
\$0B		Misfire cylinder 2, Average value over 10 Driving Cycles.	0 - 65535 (counts)	Refer to DTC P0302 in the DTC summary table. ⇒ page 60.
\$0C		Misfire cylinder 2, in this Driving Cycle.	0 - 65535 (counts)	Refer to DTC P0302 in the DTC summary table. ⇒ page 60.

- If any of components or systems fail to meet the specified values. Refer to Diagnostic "Mode 03: Interrogating Fault Memory" to check for stored DTC's or the corresponding diagnostic repair procedure ⇒ "3.3.3 Diagnostic Mode 03 - Read DTC Memory", page 14
- Switch the ignition off.

Monitor-ID \$A4: Mis-Fire Cylinder 3 Data

- Connect the scan tool.
- Start the engine and run at idle.
- Select "Mode 6: Check test the results of components that are not continuously monitored". .d . gen AG. Volkswagen AG does not guaranteeo.

Select "Monitor-ID A4".

- Select the desired "Test-ID".
- Check specified values at idle.

Test-ID	DTC	Component or System	Min./Max. Values	Additional Information					
\$0B	P0303	Misfire cylinder 3, Average value over 10 Driving Cycles.	0 - 65535 (counts)	Refer to DTC P0303 in the DTC summary table. ⇒ page 60.					
whole, is, no.	P0303	Misfire cylinder 3, in this Driving Cycle.	0 - 65535 (counts)	Refer to DTC P0303 in the DTC summary table. ⇒ page 60.					
torin			toth						
ues. Refer ory" to chec repair proc									
Monitor-ID \$A	Monitor-ID \$A5: Mis-Fire Cylinder 4 Data								
 Connect th 	- Connect the scan tool.								
- Start the er	- Start the engine and run at idle.								
 Select "Mo not continue" 		neck test the results of componer nonitored".	nts that are						

Monitor-ID \$A5: Mis-Fire Cylinder 4 Data

- Connect the scan tool.
- Start the engine and run at idle.
- Select "Mode 6: Check test the results of components that are . DA negswexlo V to Ing. not continuously monitored".

Select "Monitor-ID A5"? Pologologo

- Select the desired "Test-ID".
- Check specified values at idle.

Test-ID	DTC	Component or System	Min./Max. Values	Additional Information
\$0B	P0304	Misfire cylinder 4, Average value over 10 Driving Cycles.	0 - 65535 (counts)	Refer to DTC P0304 in the DTC summary table. ⇒ page 61.

Test-ID	DTC	Component or System	Min./Max. Values	Additional Information
\$0C		Misfire cylinder 4, in this Driving Cycle.		Refer to DTC P0304 in the DTC summary table. ⇒ page 61.

- Switch the ignition off.
- If any of the components or systems fail to meet the specified values, refer to Diagnostic Mode 03: Interrogating Fault Memory to check for stored DTCs or the corresponding diagnostic repair procedure.
- Switch the ignition off.

oft. Jostic N. Ad During th. Je Jit possible to check emis. J during the current or last o. TC is saved the first time a fault is de. J.). Jult is detected again by the end of the following a confirmed DTC is entered (output via Mode 0's, ill. is activated. Is malfunction is not detected again by the end of the following driving cycle, the corresponding pending code will be eleted at the end of the driving cycle. Note Depending on scan tool and protocol used, some of the informance of the provided may be referred to by a different name. Procedure Connect the scan tool. In the engine and run at idle. To trank the engine using starter for at a roll switch the ignition off afterward. The results of components that are The malfunctions detected will be a stic repair procedures. 3.3.6 Diagnostic Mode 07 - Read Faults De-





to turn on-board system ON or OFF, or to cycle an on-board system, test or component on or off for a specific period of time. The service can also be used to request system status or to report test results.

Test requirements

- No DTCs stored in the DTC memory.
- Intake Air Temperature (IAT) maximum 60 °C.
- Coolant temperature 80 -110 °C.
- Throttle valve angle 12.0 16.0%.

Function test



Note

test, the ies.

Adov Nolkswagen AG. Volkswagen AG does not gualantee of accepta If the accelerator pedal is depressed during the test, the test will be aborted.

- Connect the scan tool.
- Start the engine and run at idle for at least 15 minutes.
- Select "Mode 8: Tank Leak Test".
- Select "Test-ID 01: Tank Leak Test".
- Check the specified value of the tank leak test at idle.
- The following will be displayed on the scan tool screen:

Tank leak test	Specified value
♦ Test function active	Test OK
◆ Test function is being initiated, please wait	inecc
♦ Test off	
♦ Test aborted	ness

- Switch the ignition off.

If the specified result is obtained?

System OK.

If the specified result is Not obtained:

- Repeat the tank leak test, switch the ignition off and start the engine again and let run for 15 minutes at idle. Protectedby
- Switch the ignition off.

If the specified result is again Not obtained:

- A leak may be present.

3.3.8 Diagnostic Mode 09 - Read Vehicle Information

Diagnostic Mode 09 makes it possible to access vehicle-specific information from the ECM and the TCM (where applicable).







Note

Test requirement

Procedure

- Connect the scan tool.
- Switch the ignition on:
- Select Mode 09: Vehicle information.
- Select the desired Test-ID.
- The information requested will be displayed on the scan tool

Jetta Gen	a/Beetle 2011 ➤ eric Scan Tool - Edition 11.2014 In scan tool and protocol used, Diagnostic Mode 09 mation provided may be referred to by a different Thent stored in the DTC memory. The scan tool de 09: Vehicle information. desired Test-ID. mation requested will be displayed on the scan tool table is a numerical list of all Test-IDs that may be Diagnostic text
Note	agen AG. Volkswagen AG.
Depending of and the information	n scan tool and protocol used. Diagnostic Mode 09 mation provided may be referred to by a different
Toet requirer	nent deline
No DTCo	person in the DTC mamon.
December	stored in the Disc memory.
Procedure	\$\langle \sigma_{\oldsymbol{\sigma}} \sigma_{\oldsymbol{\oldsymbol{\sigma}}} \sigma_{\oldsymbol{\oldsymbol{\sigma}}} \sigma_{\oldsymbol{\oldsymbol{\sigma}}} \sigma_{\oldsymbol{\oldsymbol{\sigma}}} \sigma_{\oldsymbol{\oldsymbol{\sigma}}} \sigma_{\oldsymbol{\oldsymbol{\simbol{\sigma}}} \sigma_{\oldsy
- Connect ti	ne scan tool.
- Switch the	e ignition on to
- Select Mo	de 09: Vehicle information.
 Select the 	desired Test-ID.
 The inform screen. 	nation requested will be displayed on the scan tool
The following selected.	table is a numerical list of all Test-IDs that may be
Test-ID	Diagnostic text
02:	Vehicle identification number e.g.
	♦ A different 17 digit number will be displayed for each vehicle
04:	Calibration identification e.g.
	◆ Engine Control Module Control Mod
	◆ Transmission Control Module (TCM)
06:	CVN (check sum) e.g.
	◆ EC5AE460 the check sum is different for every control module version
	◆ 000D105

Service \$0A	Request Emission Related DTC's with Permanent Status - SUPPORTED
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Switch the ignition off.

3.4

Engine DTC Tables 3.4.1

	DEC.	E	Malfaration Ori	OID	`&	F	D'
Shor	DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
ommercial purposes, in part or in whole, is ho	P000 A	Intake Camshaft Position Slow Re- sponse	• Signal change > 8° CRK for > 2.9 s and ad- justment an- gle < 2.5° CRK	 Time after engine start > 3 s Frequency 4 times Frequency at cold start 2 times 	n respect to the correctness of information	• 2 DCY	 Check the Camshaft Adjustment Valve 1 - N205 Refer to ⇒ "3.6.2 Camshaft Adjustment Valve 1 N205. Checking", page 154.
	P001 & 0 NOTE OF THE POOR OF THE PO	Intake Camshaft Position Ac- tuator Cir- cuit Open Bank 1	• Signal voltage, > 4.7 - 5.4 V	Camshaft valve off Ingine speed > 80 RPM A WARRENIE OF THE STATE OF	This of	• 2 DCY	 Check the Camshaft Adjustment Valve 1 - N205 Refer to ⇒ "3.6.2 Camshaft Adjustment Valve 1 N205. Checking", page 154
	P001 1	Intake Camshaft Position Timing - Over-Ad- vanced	Signal change Solve CRK for Solve S	 Time after engine start > 3 s Oil temperature -48 to 143.30 °C Frequency 4 times Engine speed 600 to 6000 RPM 	14 s	• 2 DCY	- Check the Camshaft Adjustment Valve 1 - N205 Refer to ⇒ "3.6.2 Camshaft Adjustment Valve 1 N205, Checking", page 154 .

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
P001 6	Crankshaft Position – Camshaft Position Correlation	ercial purposes, in part or in w	ditions	20) rev.	• 2 DCY	- Check the Camshaft Adjustment Valve 1 - N205- Refer to ⇒ "3.6.2 Camshaft Adjustment Valve 1 N205 Checking", page 154 - Check the Engine Speed Sensor - G28- Refer to ⇒ "3.6.10 Engine Speed Sensor G28, Checking", page 170
P003 0	HO2S Heater Control Cir- cuit Bank 1 Sensor 1	Heater voltage 4.70 - 5.40 V	Time after engine start > 5 s Heater commanded off House of the start of the sta	0.5 s	• 2 DCY	- Check the Oxygen Sensor 1 Before Catalytic Converter - GX10 Refer to ⇒ "3.6.25 Oxygen Sensor 1 Before Catalytic Converter GX10, Checking ", page 200 .
P003 1	HO2S Heater Control Cir- cuit Low Bank 1 Sen- sor 1	Heater volt- age < 0 to 3.26 V	 Time after engine start > 5 s Heater commanded off 	0.5 s	• 2 DCY	- Check the Oxygen Sensor 1 Before Catalytic Converter - GX10Refer to ⇒ "3.6.25 Oxygen Sensor 1 Before Catalytic Converter GX10, Checking ", page 200.

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
2	HO2S Heater Control Cir- cuit High Bank 1 Sen- sor 1	• Signal current > 5.50 A	 Time after engine start > 5 s Heater comman- ded on 	0.5 s	• 2 DCY	- Check the Oxygen Sensor 1 Before Catalytic Converter - GX10 Refer to ⇒ "3.6.25 Oxygen Sensor 1 Before Catalytic Converter GX10, Checking ", page 200.
P003 6	HO2S Heater Control Cir- cuit Bank 1 Sensor 2	Heater voltage, 4.50 - 5.50 V authorised by Volk	 Time after engine start > 5 s Heater, Commanded off 	0.5 s	• 2 DCY	- Check the Oxygen Sensor 2 Before Catalytic Converter - GX11 Refer to ⇒ "3.6.26 Oxygen Sensor 2 Before Catalytic Converter GX11 Checking", page 203 .
7	HO2S Heater Control Cir-Cout Low Bank 1 Sensor 2	• Heater volt- age < 3.00 V	 Time after engine start > 5 s Heater, Commanded off 	0.5 s	• Q DCY • Q DC	- Check the Oxygen Sen- sor 2 Before Catalytic Converter - GX11 Re- fer to ⇒ "3.6.26 Oxygen Sen- sor 2 Before Catalytic Converter GX11 Checking", page 203 .
P003 8	HO2S Heater Control Circuit High Bank 1 Sensor 2	• Heater current, > 2.70 - 5.50 A	Time after engine start > 5 s Heater, Commanded on Place of the start is a start in the start	о.5 s	• 2 DCY	- Check the Oxygen Sensor 2 Before Catalytic Converter - GX11 Refer to ⇒ "3.6.26 Oxygen Sensor 2 Before Catalytic Converter GX11 Checking", page 203 .

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	checks, MIL	Diagnostic Pro- cedure
2	HO2S Heater Control Cir- cuit Bank 1.0 Sensor 3	Heater volt+AG age 2.34 to 3.59 V	VolkEngine speed > 80 RPM • Heater commanded off	anice or accept and life	• 2 DCY	- Check the Oxygen Sensor 1 After Catalytic Converter - GX7- Refer to ⇒ "3.6.24 Oxygen Sensor 1 After Catalytic Converter GX7, Checking", page 197.
P004 Secolal purposes	HO2S Heater Control Circuit Low Bank 1 Sensor 3	Heater volt- age < 2.34 V	 Engine speed > 80 RPM Heater commanded off 	0.5 s 0.5 s	C C Arrectness of Information in	- Check the Oxygen Sensor 1 After Catalytic Converter - GX7- Refer to ⇒ "3.6.24 Oxygen Sensor 1 After Catalytic Converter GX7, Checking", page 197.
P004 4	HO2S Heater Control Cir- cuit High Bank 1 Sen- sor 3	Heater volt- age > 3.59 V	Engine speed > 80 RPM	0.5 s	• 2 DCY	- Check the Oxygen Sensor 1 After Catalytic Converter - GX7- Refer to ⇒ "3.6.24 Oxygen Sensor 1 After Catalytic Converter GX7, Checking", page 197.

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
P006 8	MAF vs Throttle Po- sition Cor- relation	Plausibility with fuel system • Load calculation < -22% Plausibility with fuel system • Load calculation > 22%	 Engine speed 1280 - 6000 RPM ECT > 63 °C IAT < 90 °C Mass air flow 0 - 300 kg/h Engine load 20 - 100% EVAP purge valve closed Fuel system monitor running Cambda control a closed loop 	139.4 s	• 2 DCY	- Check the Mass Airflow Sensor - G70 Refer to ⇒ "3.6.22 Mass Airflow Sensor G70, Checking", page 193 . - Check the Throttle Valve Control Module - GX3 Refer to ⇒ "3.6.28 Throttle Valve Control Module GX3, Checking", page 207 .
P007 0	Ambient Air Tempera ture Sensor Circuit	Ambient air temperature < -50° C	CAN active	6 s	• 2 DCY	- Check the Mass Airflow Sensor - G70 Refer to ⇒ "3.6.22 Mass Airflow Sensor G70, Checking", page 193 .
P007 1	Ambient Air Tempera- ture Sensor Range/Per- formance	Difference in value between ECT and AAT at engine start (depending on engine off time) > 25 K and Difference in value between AAT and IAT at engine start (depending on engine off time) > 25 K	 Engine off time > 5 hours ECT @ engine start < 2 K Minus AAT @ engine start <= 3 K Vehicle speed > 40 km/h minus ECT @ time after engine start 60 s AAT @ engine start < 5.2 °C minus AAT @ condition veh speed > 25 mph for time > 30 s IAT @ engine start < 5.2 °C minus IAT @ condition veh speed > 25 mph for time > 30 s 	Os S	• 2 DCY	- Check the Mass Airflow Sensor - G70 Refer to ⇒ "3.6.22 Mass Airflow Sensor G70, Checking", page 193 .

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
P007 2	Ambient Air Tempera- ture Sensor Circuit Low	temperature > 77° C	CAN active CAN active A	6 s kswagen AG doe	• 2 DCY	- Check the Mass Airflow Sensor - G70 Refer to ⇒ "3.6.22 Mass Airflow Sensor G70, Checking", page 193 .
P008 7	Fuel Rail/ System Pressure - Too Low	 Fuel trim activity 0.90 - 1.15 [-] Pressure controller activity > 2 MPa Difference between target and actual 	• Engine speed > 600 RPM • EVAP purge adaptation < 22 [-] • ECT >= 63° C • IAT < 90° C • Lambda control closed loop	5 s	• 2 DCY	Check the fuel pressure and delivery quantity. Refer to fuel system mechanical testing in 3.1 Preliminary Check page 9 and/ or to appropriate repair manual. If the actual fuel pressure does not match the scan tool reading: Check the Fuel Pressure

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parame- ters with Enable Con- ditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
P010 0	Mass Air Flow Circuit Fault	• MAF sensor signal 0 μs	• Engine speed > 20 RPM	0.2 s	• 2 DCY	- Check the Mass Airflow Sensor - G70 Refer to ⇒ "3.6.22 Mass Airflow Sensor G70, Checking", page 193 .
P010 1	Mass Air Flow Circuit Range/Per- formance	Mass air flow vs. upper threshold model > 60 to 800 kg/h lower threshold model < 0 to 400 kg/h Load calculation > 18% Fuel system < -18%	 Time after engine start, 150 camshaft revolutions Throttle position < 99.6% Engine speed 1280 - 6000 RPM ECT > 63 °C IAT < 90 °C Mass air flow 0 - 450 kg/h Engine load 20 - 100% Lambda control closed loop EVAP purge valve closed No low fuel signal 	2 s	• 2 DCY	- Check the Mass Airflow Sensor - G70 Refer to ⇒ "3.6.22 Mass Airflow Sensor G70, Checking", page 193.
P010 2	Mass Air Flow Circuit Low Input	• MAF sensor signal < 66 µs	• Engine speed > 20 RPM	0.2 s	• 2 DCY	- Check the Mass Airflow Sensor - G70 Refer to ⇒ "3.6.22 Mass Airflow Sensor G70, Checking", page 193 .
P010 3	Flow Circuit	MAF sensor signal > 4500 Signa	• Engine speed > 20 RPM	0.2 s	• 2 DCY	- Check the Mass Airflow Sensor - G70- Refer to ⇒ "3.6.22 Mass Airflow Sensor G70, Checking",
		500 to alevido do didos	746 ₄₈₀		CANFUNDO Juž	page 193 .
			Profected by	.ĐA nagewe	3. Diag	gnosis and Testing

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
6	Absolute Pressure/ Barometric	Difference of boost pres- sure signal vs altitude sen-	Engine speed < 1000 RPM Throttle position < 11.50%	2 s	• 2 DCY	- Check the Intake Manifold Sensor - GX9- or the Charge Air Pressure Sensor - G31 Refer to ⇒ "3.6.6 Charge Air Pressure Sensor G31, Checking", page 162.
	or commercial purposes, in part or in whole, is not being.	* Difference in	Nagen AG. Volkswagen AG do	MSHION KAJURUKOO	• 2 DCY	- If there is no fault found with the Charge Air Pressure sensor or wiring, check for any related TSB's. The Altitude (Baro) sensor is located within the ECM and will require replacement of the ECM if faulty. Check the Baro reading with a scan tool vs. actual Baro for the area. If Baro is off by more than 10%, replace the ECM. Refer to appropriate repair manual.
P011	Intake Air Tempera- ture Sensor 1 Circuit Range/Per- formance	 Difference in value IAT - ECT @ engine start (depending on engine off time) > 25 °C Difference in value IAT - AAT @ engine start > 25 °C (depending on engine off time) 	 Engine off time > 5 hours ECT @ engine start < 2 K minus AAT @ engine start <= 3 K Vehicle speed > 40 km/h minus ECT @ time after engine start 60 s AAT @ engine start < 5.2 °C 	0 s	• 2 DCY	- Check the Intake Air Temperature Sensor - G42 Refer to ⇒ "3.6.17 Intake Air Temperature Sensor G42, Checking ", page 183 .

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	cedure
P011 2	Intake Air Tempera- ture Sensor 1 Circuit Low Input	• IAT > 141.0° C	ditions authorised by Volkswagen AG.	2 s /olkswagenAG _C	• 2 DCY	- Check the Intake Air Temperature Sensor - G42 Refer to ⇒ "3.6.17 Intake Air Temperature Sensor G42, Checking ", page 183 .
P011 3	Intake Air Tempera- ture Sensor 1 Circuit High Input	• 146° C In the seed of the se		2 s	• 2 DCY	- Check the Intake Air Temperature Sensor G42 - Refer to ⇒ "3.6.17 Intake Air Temperature Sensor G42, Checking ", page 183.
P011 6	Engine Coolant Tempera- ture Sensor 1 Circuit Range/Per- formance	No change on signal 2 K or signal in range > 89 °C with no change on signal 1.5 °K	ECT @ start 50 - 140 °C (stuck hi) or 50.30 - 88.4 °C (stuck low) V Temp 2: Substitute ECT > -48 °C Mass air flow 28 to 84 kg/h driving conditions Veh speed 0 - 20 km/h Mass air flow 12 - 36 and 36 - 152 kg/h Time required > 40.0 s	72 s	· 2 DCY	- Check the Engine Coolant Temperature Sensor - G62 Refer to ⇒ "3.6.8 Engine Coolant Temperature Sensor G62, Checking", page 166.

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
P011 7	Engine Coolant Tempera- ture Sensor 1 Circuit Low Input	• ECT >140° C	. Volkswagen AG. Volksw	2 s	• 2 DCY	- Check the Engine Coolant Temperature Sensor - G62 Refer to ⇒ "3.6.8 Engine Coolant Temperature Sensor G62, Checking", page 166 .
		eliko dhe santori	_{sed} by Volkswagen AG. Volksw		Suarantee or accept	- Check the coolant thermostat. Refer to appropriate repair manual.
P011 8	Engine Coolant Tempera- ture Sensor 1 Circuit High Input	ECT < -40° C EUs, on the control of the c		2 s	• 2 DCY	- Check the Engine Coolant Temperature Sensor - G62 Refer to ⇒ "3.6.8 Engine Coolant Temperature Sensor G62, Checking", page 166.
		orthings of commerce			, is	- Check the coolant thermostat. Refer to appropriate repair manual.
P012 1	Accelerator Pedal Posi- tion Sen- sor / Accel- erator Ped- al Position Sensor 2 Circuit Range/Per- formance	Actual TPS 1 calculated value > TPS 2 calculated value TPS 1 calculated value TPS 1 calculated value > 9.00%	• Engine speed > 480 RPM		· 2 DCY was	- Check the Throttle Valve Control Module - GX3 Refer to ⇒ "3.6.28 Throttle Valve Control Module GX3, Checking", page 207.
P012 2	Accelerator Pedal Posi- tion Sen- sor / Accel- erator Ped- al Position Sensor 2 Circuit Low Input	Signal voltage < 0.20 V		0.1 s	• 2 DCY	- Check the Throttle Valve Control Module - GX3 Refer to ⇒ "3.6.28 Throttle Valve Control Module GX3, Checking", page 207.

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
P012 3	Accelerator Pedal Posi- tion Sen- sor / Accel- erator Ped- al Position Sensor 2 Circuit High Input	• Signal voltage > 4.81 V		0.1 s	• 2 DCY	- Check the Throttle Valve Control Module - GX3 Refer to ⇒ "3.6.28 Throttle Valve Control Module GX3, Checking", page 207 .
P013 0	cuit Bank 1 Sen- sor 1	temp. < 640°	Modeled exhaust temp > 300° C • Fuel cutoff not ac- tive	of accept and liability with respec	Ct to	- Check the Oxygen Sensor 1 Before Catalytic Converter - GX10 Refer to ⇒ "3.6.25 Oxygen Sensor 1 Before Catalytic Converter GX10, Checking ", page 200
P013 1 or commercial purposes, in pa	HO2S Cir- cuit, Bank 1 Sensor 1	 VM > 1.75 V UN > 1.50 V IA or IP > 0.30 V 		10 s	2 DCY	- Check the Oxygen Sensor 1 Before Catalytic Converter - GX10 Refer to ⇒ "3.6.25 Oxygen Sensor 1 Before Catalytic Converter GX10, Checking ", page 200 .
P013 2	コロヘクマ ヘげのん	• VM > 3.25 V • UN > 4.40 V • IA or IP > 7 V	DA NONKEWAGEN AG.	10 s	• 2 DCY	- Check the Oxygen Sensor 1 Before Catalytic Converter - GX10Refer to ⇒ "3.6.25 Oxygen Sensor 1 Before Catalytic Converter GX10, Checking ", page 200.

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure	
P013 3	HO2S Circuit Slow Response Bank 1 Sensor 1	Signal dynamic slope check O2S signal front vs. modeled O2S signal ratio < 0.35 and > 0.01 Lower value of both counters for area ratios L to R and R to L > = 5 times Oscillation check Lambda amplitude signal > 20% Cycles > 8 Time lambda amplitude 400 m s Delay check Delay modeled lambda signal minus measured signal > 460 m s Cycles > 12	 Engine speed, 1200 - 2800 RPM Engine load, 18 - 80% Delta engine load <= 7.99% Actual lambda, 0.85-1.15 Lambda control, Closed loop EVAP purge flow < 18- Determination of max and min slope ratios 0.01 - 4 O2S front - time since operation 	96 s Oscillation and delay check 200 s Wagen AG. Volks	• 2 DCY	- Check the Oxygen Sensor 1 Before Catalytic Converter - GX10 Refer to ⇒ "3.6.25 Oxygen Sensor 1 Before Catalytic Converter GX10, Checking ", page 200	with respect to the second information in
P013 5	HO2S Heater Cir- cuit Bank 1 Sensor 1	Heater duty cycle, >100% O2S ceramic temperature, < 715 °C Time after O2S heater on 40 s	 Heater control, Active Modeled exhaust gas temp, > 300 ° C ECT at start > -11 °C Engine shutoff time > 300 s 	• 40 - 55 s		- Check the Oxygen Sensor 1 Before Catalytic Converter - GX10 Refer to ⇒ "3.6.25 Oxygen Sensor 1 Before Catalytic Converter GX10, Checking ", page 200.	

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
P013 6	HO2S Cir- cuit Bank 1 Sensor 2 Malfunction	 Delta voltage one step at heater switching > 2.00 V Number of checks >= 4 	Sensor voltage <= 0.40 V or 0.50 to 1.08 V.		• 2 DCY	- Check the Oxygen Sensor 2 Before Catalytic Converter - GX11 Refer to ⇒ "3.6.26 Oxygen Sensor 2 Before Catalytic Converter GX11 Checking", page 203
P013 7	HO2S Cir- cuit Low Voltage Bank 1 Sen- sor 2	Cold condition Signal voltage, < 0.06 V for 3 s Warm condition Signal voltage < 0.01 V Reaction at closed loop enrichment - no reaction	 1.08 V Warm condition Sensor sufficient heated if exhaust temperature >= 650 °C 650 °C Anagen AG. Volkswage 		• 2 DCY	- Check the Oxygen Sensor 2 Before Catalytic Converter - GX11 Refer to ⇒ "3.6.26 Oxygen Sensor 2 Before Catalytic Converter GX11 Checking", page 203.
P013 8	alpurposes, in part or in who,	• Signal voltage		5 s	• 2 DCY	- Check the Oxygen Sensor 2 Before Catalytic Converter - GX11 Refer to 3.6.26 Oxygen Sensor 2 Before Gatalytic Gonverter GX11 Checking", page 203 .
P013 9	HO2S Cir- Scuit Slow Response Bank 1 Sen- sor 2	transient time at fuel cutoff > 0.0 s In voltage range of 201 - 401 my Number of checks, >= 3	ble > = 547.9 mV	DA nagsweylo V w	• 1 DCY	Check the Oxygen Sensor 2 Before Catalytic Converter - GX11 Refer to ⇒ "3.6.26 Oxygen Sensor 2 Before Catalytic Converter GX11 Checking", page 203 .

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.		
P013 A	HO2S Cir- cuit	low Re- ponse tial transient time at fuel cutoff >= 0.65 s	MA filtered • time of fuel cut off 10 s s not gue	• multiple – Check the Oxygen Sen			
	sponse Rich to		time after last fuel cut off >= 20.0 Sec		Catal Conv GX7- fer to ⇒ "3. Oxyg sor 1 Catal Conv GX7 jng",	sor 1 After Catalytic Converter -	
	Lean Bank 1 Sensor 3		deviation between expected and measured front O2-sensor lambda signal < 6.00			Catalytic Converter GX7, Check-	
	in whole		O2S rear readi- ness,>10 Sec				
	n part or		oscillation check completed	A nagewello V va,			
	ial purposes, ii		after time since fuel cut off at first cylinder >= 0.5 Sec				
	o o o o o o o o o o o o o o o o o o o		exhaust tempera- ture at sensor >340° C				
			• exhaust mass flow > 12.00 kg/h				
			exhaust mass flow dynamic within range -250.00150.00				
			sensor voltage at start of measure- ment > 0.52 V				
			target sensor volt- age end of meas- urement <= 0.18 V				
			engine speed 8006000 rpm				

DT	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
B	HO2S Circuit Slow transient time Lean to Rich Bank 1 Sensor 2	EWMA filtered max differential transient time at fuel cutoff >= 1.50 s Number of checks >= 1.0 [-] Weswagen AG. Volkswagen AG.		10 s	• Once / DCY • 1 DCY	- Check the Oxygen Sensor 2 Before Catalytic Converter - GX11 Refer to ⇒ "3.6.26 Oxygen Sensor 2 Before Catalytic Converter GX11 Checking", page 203 .

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
P013 E	HO2S Circuit check of de- lay time Rich to Lean Bank 1 Sensor 2	arithmetic filtered max differential delay time at lean to rich transition = n.a. OR EWMA filtered max differential delay time at lean to rich transition >	O2S front out of range = ready, no fault general: heat supply = n.a. integrated exhaust	40 s	• Once / DCY • 1 DCY	- Check the Oxygen Sensor 2 Before Catalytic Converter - GX11 Refer to ⇒ "3.6.26 Oxygen Sensor 2 Before Catalytic Converter GX11 Checking"
		1.0 [s] and number of checks >= 3.00 [-]	 integrated exhaust mass during > 0.20 [kg] catalyst tempera- ture 400 - 850 [°C] 			Checking", page 203
			• exhaust mass flow 40.00 - 180.00 [kg/h]			
			 change of exhaust mass flow -65.00 -65.00 [kg/h] engine speed = 			
		Juhorised by Volkswagen	• O2S rear stuck not lean / stuck rich = ready, no fault	Tuarantee or accept		
	in Solid Strate		scavenging: scavenging-rate = n.a. integrated air		8	
	n whole, is not,		mass = n.a lambda control = n.a.		Nwith respect	
2.			lambda set value = n.a.for time = n.a		o the correctr	
	nercial purpos		Binary sensor front fit- ted: O2S front voltage = n.a		less of informa	
	or pivate or com	Protected by copyright, C.	 integrated air mass = n.a lambda control = n.a. lambda set value = n.a. for time = n.a Binary sensor front fitted: O2S front voltage = n.a linear sensor front fitted: lambda value > 1 [-] CASE 1: (Diagnosis in Catalyst State full) time after engine start = n.a. Threshold 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	aure	ation in this op	
	Oling	o julgindoo va beloeve	Catalyst State full) time after engine start = n.a.	KOMPINGOO. Just		
			O2S rear voltage < 0 [V]			

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
			 gradient O2S rear voltage -160 [V/s] 			
			• HO2S mass flow >= 50 [mg]			
			- Threshold 2 • O2S rear voltage < 0.4 [V]			
			- Threshold 2 O2S rear voltage < 0.4 [V] CASE 2: (Diagnosis at Fuel Feed Restart) integrated exhaust mass flow n.a Volvintegrated exhaust mass = n.a. of the number of exhaust mass flow = n.a. catalyst temperature = n.a. exhaust mass flow = n.a. gradient of exhaust mass flow = n.a. o2S rear voltage = n.a. after fuel cut off = n.a. for time = n.a. HO2S mass = n.a.			
		Volkswagen AG	Volkintegrated exhaust mass = n.a. short			
	-ssauth	orised By	• exhaust mass during = n.a.	antegoracceptantia		
	Holling		 catalyst tempera- ture = n.a 	Cepran.		
	notoem		• exhaust mass flow = n.a	201		
r in whole .			• gradient of ex- haust mass flow = n.a.		, with respect to the correctness of $informatio_D$	
npart o			engine speed = n.a.		the cor	
poses, i			O2S rear voltage = n.a.		rectnes	
rcial pur			after fuel cut off = n.a		s of infor	
98			• for time = n.a.		matic	
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DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
P013 F	HO2S Circuit check of de- lay time Lean to Rich Bank 1 Sensor 2	arithmetic filtered max differential delay time at lean to rich transition = n.a. OR EWMA filtered max differential delay time at lean to rich transition > 1.5 [s] and number of checks >= 3.00 [-]	O2S front out of range = ready, no fault general: heat supply = n.a. integrated exhaust mass > 1.00 [kg] integrated exhaust mass flow after O2S rear ready > 0.50 [kg] integrated exhaust mass during > 0.20 [kg] catalyst temperature 400 - 850 [°C] exhaust mass flow 40.00 - 180.00 [kg/h] change of exhaust mass flow -65.00 [kg/h] engine speed = 1320 - 5000 [rpm] O2S rear stuck lean / stuck rich = ready, no fault	40 s	• Once / DCY ♣G. ႃ၎Φ©ႃϒgen,	- Check the Oxygen Sensor 2 Before Catalytic Converter - GX11- Refer to ⇒ "3.6.26 Oxygen Sensor 2 Before Catalytic Converter GX11 Checking", page 203 .

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	ditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
			 gradient O2S rear voltage -160 [V/s] 			
			• HO2S mass flow >= 50 [mg]			
			- Threshold 2 • O2S rear voltage < 0.4 [V]			
			CASE 2: (Diagnosis at Fuel Feed Restart) integrated exhaust mass flow n.a			
			integrated exhaust mass = n.a.			
			• exhaust mass during = n.a.			
			 catalyst tempera- ture = n.a 			
			• exhaust mass flow = n.a			
			gradient of ex- haust mass flow = n.a.			
			• engine speed = n.a.			
			O2S rear voltage = n.a. after fuel cut off ∓ A n.a for time = n.a. HO2S mass = n.a.			
			• after fuel cut offer A n.a	G. Volkswagen A	Gdoesnot gua	
			• for time = n.a. • HO2S mass = n.a.		-drante	Re Or
P014	HO2S Cir-	Signal voltage	 Sensor voltage <= 	38 s	• 2 DCY	Check the
0	cuit No Ac- tivity Detec-	• Signal volt- age, 0.40-	0.40 V or 0.50 to 1.08 V	00 3	2 501	Oxygen Sen- sor 2 Before
	ted Bank 1 Sensor 2	0.60 V for > 3 s Internal resist-	Sensor threshold. • Modeled exhaust gas temp. 700° C			Catalytic Converter - GX11 Re- fer to
		ance \(\frac{\xi}{2}\) • > 40\(\text{000}\)00 ohm	for > 10 s			<u>⇒ "3.6.26</u> 5 Oxygen Sen-
		l purposes, in p	• Heater power >= 50%			sor 2 Before Catalytic Converter GX11 Checking
		mercia				page 203
		FOO PO STRANGO				ton in this cook
		Ö	Olingoo Houngoo Kan		Sansylo V Kataley	page 203
			Protecter	.DA	nap _{RM} .	anneis and Tostina
					3. Diag	gnosis and resulty -

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
P014 1	HO2S Heater Cir- cuit Bank 1 Sensor 2	• Heater resist- ance, 702 - 5250 Ω	 Heater commanded on Modeled exhaust gas temp, 250 - 650° C Number of checks 10 Engine shutoff time > 60 s Fuel cutoff not active 	15 s	• 2 DCY	- Check the Oxygen Sensor 2 Before Catalytic Converter - GX11 Refer to ⇒ "3.6.26 Oxygen Sensor 2 Before Catalytic Converter GX11 Checking", page 203.
P014 2	HO2S Sen- sor Circuit Bank 1 Sen- sor 3	 Delta voltage one step at heater > 2.0 V number of checks, 4 	 Modeled exhaust gas temp 700° C for > 10 s Dew point exceeded and lower exhaust gas temp limit exceeded for 60 s 	40 s	• 2 DCY	- Check the Oxygen Sen- sor 1 After Catalytic Converter - GX7- Refer to ⇒ "3.6.24 Oxygen Sen- sor 1 After Catalytic Converter GX7, Check- ing", page 197
P014 3	HO2S Sensor Circuit Low Voltage Bank 1 Sensor 3	Cold/Warm condition Signal voltage < 0.06 V for > 3 s	Cold condition Sensor voltage <= 0.40 V or 0.50 to 1.08 V Modeled exhaust gas temp. 700 °C for > 10 s Heater power >= 50% for > 10 s	3 s	• 2 DCY	- Check the Oxygen Sensor 1 After Catalytic Converter - GX7Refer to ⇒ "3.6.24 Oxygen Sensor 1 After Catalytic Converter GX7, Checking". page 197
P014 4	HO2S Sensor Circuit High Voltage Bank 1 Sensor 3	• Signal voltage > 1.08 V for > 5 s	 Sensor voltage <= 0.40 V or 0.50 to 1.08 V Modeled exhaust gas temp. 700 °C for > 10 s 	5 s	• 2 DCY	- Check the Oxygen Sensor 1 After Catalytic Converter - GX7Refer to ⇒ "3.6.24 Oxygen Sensor 1 After Catalytic Converter GX7, Checking", page 197.

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
P014 5	HO2S Sensor Circuit Slow Response Bank 1 Sensor 3	EWMA filtered transient time at fuel cutoff > 1.2 s In voltage range of 201.2 - 401.4 mV Number of checks, 3	ble > = 548 mV • Lean voltage < = 201.2 mV • Fuel cutoff active • O2S rear ready • Modeled exhaust gas temp > 400 °C	100 s	• 2 DCY	- Check the Oxygen Sensor 1 After Catalytic Converter - GX7- Refer to ⇒ "3.6.24 Oxygen Sensor 1 After Catalytic Converter GX7, Checking", page 197
P014 6	HO2S Sensor Circuity No Activity Detected Bank Sensor	Signal voltage 0.40 - 0.60 V for > 3 s Internal resist- ance > 40000 Ohm	Cold condition • Sensor voltage <= 0.40 V or 0.50 to 1.08 V	38 s	• 2 DCY	- Check the Oxygen Sensor 1 After Catalytic Converter - GX7- Refer to ⇒ "3.6.24 Oxygen Sensor 1 After Catalytic Converter GX7, Checking", page 197
P014 7	HO2S Sensor Heater Circuit Bank 1 Sensor 3	• Heater (ECM internal) resistance 792 - 4560 ohm	 Modeled exhaust gas temp 250 - 650 °C Engine shutoff time > 60 s Fuel cutoff not active Number of checks 10 Heater commanded ded on Sylvalor 	15 s	• 2 Distormation in this object	- Check the Oxygen Sensor 1 After Catalytic Converter - GX7Refer to ⇒ "3.6.24 Oxygen Sensor 1 After Catalytic Converter GX7, Checking", page 197.
P016 9	Electronic Throttle Control Module function monitoring: injection time	 comparison with fuel quantity = incorrect Internal check failed 	• Engine speed > 1200 RPM	0.52 to 2.08 s	• 2 DCY	 Check for poor quality fuel or aged fuel in tank. Possible alcohol concentration above 15%. Drain and refill with fresh fuel (with less than 10% alcohol if ethanol fuel is used).

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parame- ters with Enable Con- ditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
P017	System Too Lean Bank 1	 Adaptive value > 5.02% At part load Adaptive value > 21% 	At idle Engine speed, 560 - 1200 RPM Engine load, 9 - 45% Mass air flow 5-23 kg/h ECT > 63 °C IAT < 90° C Part load adaptation ready Lambda control, Closed loop EVAP purge valve, Closed No low fuel signal At part load Throttle position < 99.6% Engine speed 1320 - 5000 RPM Engine load 20 - 100% Mass air flow 27 - 450 kg/h ECT > 63 °C IAT < 90 °C Lambda control closed loop EVAP purge valve closed No low fuel signal		• 2 DCY	- Check the Fuel Pressure Sensor - G247 Refer to ⇒ "3.6.15 Fuel Pressure Sensor G247 . Checking", page 179 - Check the Fuel Injectors . Refer to ⇒ "3.6.13 Fuel Injectors . Refer to ⊙ Sygen Sensor 1 Before Catalytic Converter - GX10 Refer to ⊙ Sygen Sensor 1 Before Catalytic Converter GX10 Refer to ⊙ Sygen Sensor 1 Before Catalytic Converter GX10 Checking ", page 200 . Checking ", page 200 . Check the intake system visually for leaks, or engine gaskets, oil cap loose/missing that can allow air in the via the PCV system Check the vacuum lines visually for leaks.
			3. Elikaro	Protectedbyco	-DAne,	_{Эемэно Л} оцідиру V откама

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
P017 2	System Too Rich Bank 1	At idle • Adaptive value < -5.02%	At idle Engine speed, 560 1200 RPM Engine load, 9 - 45% Mass air flow 5-23 kg/h ECT > 63 °C IAT < 90° C Part load adaptation ready Lambda control, Closed loop EVAP purge valve, Closed No low fuel signal At part load	• 10 s	• 2 DCY	- Check the Fuel Pressure Sensor G247 Refer to ⇒ "3.6.15 Fuel Pressure Sensor G247 . Checking", page 179 - Check the Fuel Injectors . Refer to ⇒ "3.6.13 Fuel Injectors . Refer to ∴ Checking", page 175 . - Check the Oxygen Sensor 1 Before Catalytic Converter - GX10 Refer to ⇒ "3.6.25 Oxygen Sensor 1 Before Catalytic Converter GX10 . Checking ", page 200 . - Check the EVAP Canister Purge Regulator Valve 1 - N80 Refer to ⇒ "3.6.11 EVAP Canister Purge Regulator Valve 1 N80 . Checking", page 171 .
P019 0	Fuel High Pressure Sensor Cir- cuit Open or Short to Battery Voltage	• Signal voltage > 4.8 V		0.5 s	• 2 DCY	- Check the Fuel Pres- sure Sensor - G247 Re- fer to ⇒ "3.6.15 Fuel Pres- sure Sensor G247, Checking", page 179

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
P019 1	Fuel High Pressure Sensor Cir- cuit Range / Perform- ance	Actual pressure > 20.6 MPa	Time after engine start > 0 s Engine speed > 90 RPM		• 2 DCY	- Check the fuel pressure and delivery quantity. Refer to fuel system mechanical testing in ⇒ "3.1 Preliminary Check", page 9 and/ or to appropriate repair manual.
				adby Volkewage	_n AG. Volkswager	- If the actual fuel pressure does not match the scan tool reading: Check the Fuel Pressure Sensor-G247 Refer to ⇒ "3.6.15 Fuel Pressure Sensor G247. AG Checking", page 1.79.
			Copyright of the part of the whole, is not being the part of the whole, is not being the part of the p	1580		- If the actual fuel pressure matches the scan tool reading: Check the Fuel Pressure Regulator Valve - N276 ⇒ "3.6.14 Fuel Pressure Regulator Valve N276, Checking", page 177.
P019 2	Fuel High Pressure Sensor Cir- cuit Short to ground	• Signal voltage < 0.2 V		0.5 s	• 2 DCY	- Check the Fuel Pressure Sensor G247 Refer to ⇒ "3.6.15 Fuel Pressure Sensor G247, Checking" Checking Dage 17.9

	DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
	P020 1	Injector Cir- cuit Open Cylinder 1	 Low side signal current < 2.1 A Internal logic failure 	 Engine speed, > 80 RPM Injection valve switched on 	0.5 s	• 2 DCY	- Check the Cylinder 1 Fuel Injector - N30 Refer to ⇒ "3.6.13 Fuel Injectors, Checking", page 175.
	P020 2	Injector Cir- cuit Open Cylinder 2	 Low side signal current < 2.1 A Internal logic failure 	 Engine speed, > 80 RPM Injection valve switched on 	0.5 s	• 2 DCY	 Check the Cylinder 2 Fuel Injector - N31 Refer to \$\frac{3}{3}.6.13 \text{ Fuel Injectors, Checking", page 175}\$
7,57	3	Injector Circuit Open Cylinder 3	Low side sigager and current < 2.1 A Internal logic failure	Engine speed, > 80 RPM Injection valve switched on	0.5 s	• 2 DCY	 Check the Cylinder 3 Fuel Injector N32 Refer to 3.6.13 Fuel Injectors Checking page 175
elu Whole,	P020 4	Injector Circuit Open Cylinder 4	nal current < 2.1 A Internal logic failure	 Engine speed, > 80 RPM Injection valve switched on 	0.5 o	• 2 DCY	- Check the Cylinder 4 Fuel Injector - N33 Refer to ⇒ "3.6.13 Fuel Injectors, Checking", page 175.
ornmerc	P022 1	Accelerator Pedal Posi- tion Sensor 1/Accelera- tor Pedal Position Sensor 2 Circuit Range/Per- formance	TPS 1 - TPS 2 > 6.30% Actual TPS 2 calculated value > TPS 1 calculated value TPS 2 - calc. value > 9.00% TPS 2 - calc.	480 RPM	0.3 s	• 2 DCY	- Check the Throttle Valve Control Module - GX3 Refer to ⇒ "3.6.28 Throttle Valve Control Module GX3, Checking", page 207

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
P022 2	Accelerator Pedal Posi- tion Sen- sor / Accel- erator Pedal al Position Sensor 2 Circuit Short to Ground	Signal voltage < 0.20 Vage Only Origed DV Origed DV Origed DV Original voltage Original voltage	Secondary Parameters with Enable Conditions Nolkswagen AG does not gue	0.1 s	ity with respe	- Check the Throttle Valve Control Module - GX3 Refer to ⇒ "3.6.28 Throttle Valve Control Module GX3, Checking", page 207 .
P 3 B 3 Secret on part or by the bart of	Accelerator Pedal Posi- tion Sen- sor / Accel- erator Ped- al Position Sensor 2 Circuit Short to Battery Voltage	• Signal voltage > 4.81 V		0.1 s	Othe correctness of information in a	- Check the Throttle Valve Control Module - GX3 Refer to ⇒ "3.6.28 Throttle Valve Control Module GX3, Checking", page 207.
P023 4	Turbo- charger Overboost Condition	Difference of set value boost pressure vs altitude sensor signal > 260 - 1275 hPa	• Altitude < 2700 m	1.2 s	• 2 DCY	- Check the Intake Manifold Sensor - GX9- or the Charge Air Pressure Sensor - G31 Refer to ⇒ "3.6.6 Charge Air Pressure Sensor G31, Checking", page 162.
						- Check the Wastegate Bypass Regulator Valve - N75 Refer to ⇒ "3.6.30 Wastegate Bypass Regulator Valve N75 , Checking". page 211 .

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
P023 6	Turbo- charger Boost Sen- sor Circuit Range/Per- formance	Difference of boost pres- sure signal vs. altitude sen- sor signal > 230 hPa or < 230 hPa	• Inrottle position < 6.81%		A and light mith resp	- Check the Intake Manifold Sensor - GX9- or the Charge Air Pressure Sensor - G31 Refer to ⇒ "3.6.6 Charge Air Pressure Sensor G31, Checking", page 162.
P023 7	Turbo- charger Boost Sen- sor Circuit Short to Ground	• Signal voltage < 0.2 V	RPM '	0.5 s	the correctness of information in this cooling.	- Check the Intake Manifold Sensor - GX9- or the Charge Air Pressure Sensor - G31 Refer to ⇒ "3.6.6 Charge Air Pressure Sensor G31 . Checking", page 162 .
P023 8		Signal voltage	• Engine speed > 80 RPM and throttle position < 6.81%	0.5 s	• 2 DCY	- Check the Intake Manifold Sensor - GX9- or the Charge Air Pressure Sensor - G31 Refer to ⇒ "3.6.6 Charge Air Pressure Sensor G31, Checking", page 162 .
P024 3	Turbo- charger Wastegate Solenoid Circuit Open	• Signal voltage > 5.6 - 4.4 V	 Charge (boost) pressure control valve, commanded off Engine speed > 80 RPM 	0.5 s	• 2 DCY	- Check the Wastegate Bypass Regulator Valve - N75 Refer to ⇒ "3.6.30 Wastegate Bypass Regulator Valve N75 , Checking", page 211 .

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
P024 5	Turbo- charger Wastegate Solenoid Circuit Short to Ground	• Signal voltage < 3.25 - 2.15 V	 Charge (boost) pressure control valve, commanded off Engine speed, > 80 RPM 	0.5 s	• 2 DCY	- Check the Wastegate Bypass Reg- ulator Valve - N75- Refer to ⇒ "3.6.30 Wastegate Bypass Reg- ulator Valve N75, Check- ing", page 211
P024 6	Turbo- charger Wastegate Solenoid Circuit Short to Battery Voltage	• Signal current > 2.2 to 4 A	 Charge (boost) pressure control valve, commanded on Engine speed, > 80 RPM 	0.5 s	• 2 DCY	- Check the Wastegate Bypass Regulator Valve - N75 Refer to ⇒ "3.6.30 Wastegate Bypass Regulator Valve N75 , Checking", page 211 .
A	Fuel Pump Module Control Cir- cuit Open	Signal voltage 4.40 - 5.60 V Signal voltage Signal voltage	RPM .		• 2 DCY	- Check the Fuel Delivery Unit - GX1- / Fuel Pump Control Module - J538 Refer to ⇒ "3.6.12 Fuel Delivery Unit GX1 / Fuel Pump Control Module J538 , Checking", page 173 .
DC C both or in part or in whole is	Fuel Pump Module Control Cir- cuit Low	• Signal voltage 2.15 - 3.25 V	• Engine speed > 80 RPM	0.5 \$	U V With respect to the correctness of informa	- Check the Fuel Delivery Unit - GX1- / Fuel Pump Control Mod- ule - J538 Refer to ⇒ "3.6.12 Fuel Delivery Unit GX1 / Fuel Pump Control Mod- ule J538, Checking", page 173 .
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DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
P025 D	Module Control Cir- cuit High	• Signal current > 1.10 A	• Engine speed > 80 RPM RPM Nagen AG. Volkswagen AG do	es not guarantes o,	• 2 DCY	- Check the Fuel Delivery Unit - GX1- / Fuel Pump Control Module - J538 Refer to ⇒ "3.6.12 Fuel Delivery Unit GX1 / Fuel Pump Control Module J538, Checking", page 173.
P026 1	Cylinder 1 Injector Cir- cuit Low	• Signal current < 2.1 A	 Injection valve, Commanded on Engine speed, > 80 RPM High side signal current, > 4.20 A 	0.5 s	• 2 DCY Special Actual TPS 2 calculated value > TPS 1 calculated value	- Check the Cylinder 1 Fuel Injector - N30 Refer to 3.6.13 Fuel Injectors, Checking", page 175 .
P026 2	Cylinder 1 Injector Cir- cuit High	401 BUIADO 746U.	Commanded on • Engine speed, > 80 RPM	0.5 s	• 2 DCY	- Check the Cylinder 1 Fuel Injector - N30 Refer to ⇒ "3.6.13 Fuel Injectors, Checking", page 175 .
P026 4	Cylinder 2 Injector Cir- cuit Low	• Signal current, < 2.1 A	 Injection valve, and commanded on commanded on speed, > 80 RPM High side signal current, > 4.20 A 	0.5 S	• 2 DCY	- Check the Cylinder 2 Fuel Injector - N31 Refer to ⇒ "3.6.13 Fuel Injectors, Checking", page 175 .
P026 5	Cylinder 2 Injector Cir- cuit High	• Signal current > 14.70 A	 Injection valve, Commanded on Engine speed, > 80 RPM 	0.5 s	• 2 DCY	- Check the Cylinder 2 Fuel Injector - N31 Refer to ⇒ "3.6.13 Fuel Injectors, Checking", page 175 .

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
P026 7	Cylinder 3 Injector Cir- cuit Low	• Signal current < 2.1 A	 Injection valve, Commanded on Engine speed, > 80 RPM High side signal current, > 4.20 A 	0.5 s	• 2 DCY	- Check the Cylinder 3 Fuel Injector - N32 Refer to ⇒ "3.6.13 Fuel Injectors, Checking",
P026 8	Cylinder 3 Injector Cir- cuit High	• Signal current > 14.70 A	Commanded on	0.5 s	• 2 DCY G. Volkswagen A	page 175. - Check the Cylinder 3 Fuel Injector - N32 Refer to 3.6.13 Fuel Injectors. Checking page 175
P027 0	Cylinder 4 Injector Cir- cuit Low	• Signal current < 2.1 A	 Injection valve, Commanded on Engine speed, > 80 RPM High side signal current, > 4.20 A 	0.5 s	• 2 DCY	- Check the Cylinder 4 Fuel Injector - N33 Refer to ⇒ "3.6.13 Fuel Injectors, Checking", page 175 .
P027 1	Cylinder 4 Injector Cir- cuit High	• Signal current > 14.70 A	Injection valve, Commanded on Engine speed, > 80 RPM	0.5 s	• 2 DCY	- Check the Cylinder 4 Fuel Injector - N33 Refer to ⇒ "3.6.13 Fuel Injectors, Checking", page 175 .
P029 9	Turbo- charger Un- derboost	Difference of set boost pressure vs actual boost pressure val- ue > 150 hPa	 Engine speed > 2800 RPM Altitude < 2700 m Difference of set value boost pressure vs basic boost pressure value > 250 hPa Boost pressure control active Turbo charger bypass valve closed 	6 s	• 2 DCY	- Check the charge air system for proper seal. Refer to appropriate re-

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
P030 0	Random Misfire De- tected	Emission threshold 1st interval Mis- fire Rate (MR), > 2.65%	 Time from start, 0 s IAT, > -48° C Time after engine start, Idle +/- 150 	• 1000 Rev. • 200 Rev.	2 DCY Immediate	Check the spark plugs visually.Check the in-
		• Catalyst damage misfire rate (MR), > 3% - 20%	RPM and 1 cam rev. • Engine torque, > 5.47-23.4%			take system visually for leaks. - Check the
			Camshaft revolutions 1			Fuel Injectors . Refer to
			 Engine speed range, 440-6800 RPM Fuel cutoff, Not ac- 	. O Volkova		<u>Injectors,</u> <u>Checking",</u>
			tive wage	AG. VOIKSWage	n AG does not guard	to %.
		if whole, is not be mit				⇒ "3.6.16 lg- nition Coils With Power Output Stage, Checking", © page 181
P030 1	Cylinder 1 Misfire De- tected	Emission threshold 1st interval Mis- fire Rate	• IAT, > -48° C	Rev. • 200	2 DCYImmed.	Check the spark plugs visually.
		(MR), ≯2.65% • Catalyst dam-	 Time after engine start, Idle +/- 150 RPM and 1 cam rev. Engine torque, > 	Rev.		- Check the in- take system visually for leaks.
		3% - 20%	age mistire rate (MR), > 3% - 20% • Engine torque, > 5.47-23.4% • Camshaft revolutions 1			- Check Fuel Injectors Refer to
			• Engine speed range, 440-6800 RPM	M		"3.6.13 Fuel Injectors, Checking", page 175
			Fuel cutoff, Not active CT at start, > -48 °C	, ř	OA nagen Alo V Var	 Check the Ignition Coils with Power Output Stage . Refer to ⇒ "3.6.16 Ignition Coils
						With Power Output Stage , Checking", page 181 .

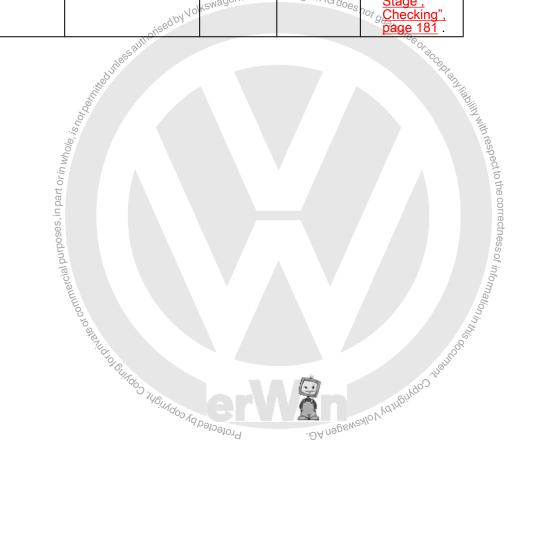
DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
P030 2	Cylinder 2 Misfire De- tected	Emission threshold 1st interval Misfire Rate (MR), > 2.65% Catalyst damage misfire rate (MR), > 3% - 20%	 Time from start, 0 s IAT, > -48° C Time after engine start, Idle +/- 1500 RPM and 1 cam rey. Engine torque, > 5.47-23.4% Camshaft revolutions 1 Engine speed range, 440-6800 RPM Fuel cutoff, Not active ECT at start, > -48 °C 	Rev.	• 2 DCY • Immed.	Injectors . Refer to "3.6 3 Fuel Injectors, Checking", page 175 . Check the Ignition Coils with Power Output Stage . Refer to ⇒ "3.6.16 Ignition Coils
P030 3	Cylinder 3 Misfire De- tected	Emission threshold 1st	 Time from start, 0 s IAT, > -48° C Time after engine start, Idle +/- 150 RPM and b cam rev. Engine torque, > 5.47-23.4% Camshaft revolutions 1 Engine speed range, 440-6800 RPM Fuel cutoff, Not active ECT at start, > -48 °C 	Rev.	• 2 DCY • Immed.	With Power Output Stage: Checking", page 181. - Check the spark plugs visually. - Check the intake system visually for leaks. - Check Fuel Injectors . Refer to 3.6.13 Fuel Injectors, Checking", page 175. - Check the Ignition Coils with Power Output Stage . Refer to 3.6.16 Ig-
						nition Coils With Power Output Stage . Checking", page 181 .

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
P030 4	Cylinder 4 Misfire De- tected	 Emission threshold 1st interval Misfire Rate (MR), > 2.65% Catalyst damage misfire rate (MR), > 3% - 20% 	 Time from start, 0 s IAT, > -48° C Time after engine start, Idle - 150 RPM Engine torque, > 5.47-23.4% Camshaft revolutions 1 Engine speed range, 480-6800 RPM Fuel cutoff, Not active ECT at start, > -10.50 °C 	Rev. • 200 Rev.	• 2 DCY • Immed.	 Check the spark plugs visually. Check the intake system visually for leaks. Check the Fuel Injectors. Refer to 3.6.13 Fuel Injectors, Checking", page 175. Check the Ignition Coils with Power Output Stage. Refer to 3.6.16 Ignition Coils With Power Output Stage. Checking", Checking",
P032 1	Engine Speed Input Circuit Per- formance	Comparison of counted teeth vs reference = incorrect monitoring reference gap failure	AG. Volkswagen AG does no.	90ar 1, 5 s	2 DCY Multiplimit respect	page 181 . - Check the Engine Speed Sen- sor - G28- Refer to ⇒ "3.6.10 Engine Speed Sen- sor G28, Checking", page 170
P032 2	.5	 Camshaft signal > 3 Engine speed, no signal 		2.5 s	• 2 Dere correctness of information	- Check the Engine Speed Sensor - G28 Refer to ⇒ "3.6.10 Engine Speed Sensor G28, Checking", page 170.
	Knock Control System Error	Signal fault counter (combustion) > 24 Signal fault counter (measuring window) > 2.00	• Engine speed 2500 RPM	0.5 s	9 8 2 DCY	- Check the Knock Sensor - G61 Refer to ⇒ "3.6.20 Knock Sensor 1 G61, Checking", page 189.

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
P032 7	Knock Sensor 1 Circuit Low	old < -0.70 V or for signal range check • Lower threshold < 0 - 1.60 V	1000 RPM or for signal range check	0.5 s	• 2 DCY	- Check the Knock Sensor - G61 Refer to ⇒ "3.6.20 Knock Sensor 1 G61, Checking", page 189.
P032 8	Knock Sensor 1 Circuit High	Upper threshold > 1.00 V or for signal range check > 15 - 115.870 V	 Engine speed, > 1000 RPM or for signal range ager check ECT > 40.5° C Engine load > 35 - 60% Engine speed > 2000 RPM 	0.5 s	• 2 DCY	- Check the Knock Sensor - G61 Refer to ⇒ "3.6.20 Knock Sensor 1 G61 , Checking", page 189 .
P034 0	Camsnatt Position Sensor Cir cuit Position Sensor Cir cuit Populari or production or	Cam adaption values out of range > 20 °KW Cam adapted and actual values > 9 °KW	 Engine speed sensor, No DTC Phase sensor, No DTC Cam adaptation, Active Engine speed sensor, No DTC Phase sensor, No DTC Camshaft adjust- 	2 s	• 2 DCY	Check the Camshaft Position Sensor - G40 Refer to "3.6.3" Camshaft Position Sensor G40 . Checking", page 156 .
P034 1	Camshaft Position Sensor Cir- cuit Per- formance	 Signal pattern incorrect Defect counter 12 [-] 		0.5 s	• 2 DCY	- Check the Camshaft Position Sensor - G40 Refer to ⇒ "3.6.3 Camshaft Position Sensor G40, Checking", page 156 .

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
P034 2	Camshaft Position Sensor Cir- cuit Low	 Signal voltage low Crankshaft signals = 8 [-] 		0.5 s	• 2 DCY	- Check the Camshaft Position Sensor - G40 Refer to ⇒ "3.6.3 Camshaft Position Sensor G40, Checking", page 156 .
P034 3	Camshaft Position Sensor Cir- cuit High	Signal voltage high Crankshaft signals = 8 [-]	adby Volkswagen AG. Volkswa	0.5 s agen AG does no	• 2 DCY	- Check the Camshaft Position Sensor - G40 Refer to ⇒ "3.6.3 Camshaft Position Sensor G40, Checking", page 156 .
P035 1	Ignition Coil A Primary Circuit			2 \$	Continuous2 DCY	- Check the Igrition Coil 1 With Power Output Stage - N70 Refer to 3 3.6.16 Igrition Coils With Power Output Stage Checking", page 181.
P035 2	Ignition Coil B Primary Circuit		680 RPM	s S S	Continuous 2 DCY Aquillando Tubuling	- Check the Ignition Coil 2 With Power Output Stage - N127 Refer to ⇒ "3.6.16 Ignition Coils With Power Output Stage Checking", page 181 .
P035 3	Ignition Coil C Primary Circuit	 Signal current 0.25 to -2.0 mA Internal check failed 	• Engine speed > 680 RPM	2 s	Continuous2 DCY	- Check the Ignition Coil 3 With Power Output Stage - N291 Refer to ⇒ "3.6.16 Ignition Coils With Power Output Stage Checking", page 181 .

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parame- ters with Enable Con- ditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
P035 4	Ignition Coil D Primary Circuit	Signal current 0.25 to -2.0 mA Internal check failed	680 RPM	2 s	 Continuous 2 DCY 	- Check the Ignition Coil 4 With Power Output Stage - N292 Refer to ⇒ "3.6.16 Ignition Coils With Power Output Stage Checking"



DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
P042 0	Catalyst System Effi- ciency Be- low Thresh- old	Front: Oxygen storage capacity (OSC) vs OSC of borderline catalyst < 1.00	Front: • Time after engine start > 0 s • Delta exhaust mass flow < 23.1 kg/h	15 to 40 s	• Once/ DCY • 2 DCY	- Check the Three Way Catalytic Converter (TWC). Re- fer to
		derline catalyst < 1.00 Front catalyst < 1.50 Main catalyst < 1.00 Main: Oxygen storage capacity (OSC) vs OSC of borderline catalyst < 0.40 Front catalyst < .90 while value for front catalyst < 2.00	 kg/h Exhaust gas mass flow, lower range 40.0 - 130.0 kg/h Exhaust gas mass flow upper range 60.0 - 130.0 kg/h Modeled exhaust gas temp, lower range > 460 °C Modeled exhaust gas temp, upper range 640 - 780 °C Engine speed 1320 — 3520 RPM Number of checks, 4 O2S front/rear, ready/no faults SAS, not active No misfire Main: Time after engine start > 80 s Delta exhaust mass flow < 30 kg/s 			fer to 3.6.27 Thre e Way Cata- lytic Convert- er (TWC), Checking", page 206. Check the Oxygen Sensor 2 Before Catalytic Converter - GX11 - Refer to 3.6.26 Oxygen Sensor 2 Before Catalytic Converter GX11 Checking", page 203. Check the Oxygen Sensor 1 After Catalytic Converter - GX7 - Refer to 3.6.24 Oxygen Sensor 1 Server Catalytic Converter - GX7 - Refer to 3.6.24 Oxygen Sensor
		Q BIHAD	h Exhaust gas mass flow, lower range 25.0 80.0 kg/h Exhaust gas mass flow upper range 60.0 - 160.0 kg/h Modeled exhaust gas temp, lower range 435 - 660 °C Modeled exhaust gas temp, upper range 530 - 740 °C Engine speed 1200 — 3520 RPM Number of checks, 4 O2S front/rear, ready/no faults SAS, not active	-SA negsw	SHO V WO HOO JAR	sor 1 After Catalytic Converter GX7, Checking", page 197

P044 Evaporative Deviation < 8% lambda System Incorrect Switch Integral 25 - 120 g	DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
Alkawagen A.G. Volkswagen A.G.	P044	Evaporative Emission System In- correct	Deviation < 8% lambda controller and 35% idle controller troller	 ters with Enable Conditions No misfire Evap purge flow integral 25 - 120 g Integrated air mass 1.50 - 2.50 kg Engine speed = idle Engine speed deviation < 80 RPM ECT > 65 °C or substitute 80 °C IAT > 4 °C 	Time Length	• Once/DCY • 2 DCY	- Check the EVAP System, for Leaks Check the EVAP Canister Purge Regulator Valve 1 - N80 Refer to ⇒ "3.6.11 EVAP Canister Purge Regulator
ASWEAMV VOOTE SERVEN VOOTE SERV				mpart or in whole, is not the same supposed by North States and St	bikswagen AG. V	olkswagen AG doe	Leak Detection Pump - V144 Refer to ⇒ "3.6.21 Leak Detection Pump V144. Checking", page 191.
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DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
P044 2	Evaporative Emission System Leak Detec-	• Time for pressure drop < 1.6 - 1.8 s	Time after engine start 12 - 65530 sECT 3.8 - 120 °C	139 s	once per / DCY2 DCY	 Check the EVAP Sys- tem, for Leaks.
	ted Small Leak		• ECT at start 5 - 50 °C			Check the EVAP Canis-
			• Engine off time > 21600 s			ter Purge Regulator Valve 1 -
			Ambient air temp 5 59 °C			N80 Refer to ⇒ "3.6.11
			 Ambient air temp drop after start < 8 °K 			EVAP Canis- ter Purge Regulator
			 Intake manifold vac. > -2560 hPa 			Valve 1 N80, Checking", page 171
			• Altitude < 2700 m			- Check the
			• Veh. speed >= 0			l
			• Veh speed once > 40 km/h			V144 Refer to
		100	Anyedrive gear agen Nolks Nolk	AG does not a		<u>⇒ "3.6.21</u> Leak Detec-
		authorised by	Restart temp diff. > 0 °K	· 9uan	antee o	tion Pump V144,
		and the sauthorise day	 Veh speed once > 40 km/h Any drive gear agen Restart temp diff. > 0 °K Purge valve closed LDP active 		Taccop _{rap}	Checking", page 191
		Tillian State of the state of t	LDP active		W lightli	
P044 4	Evaporative Emission	Signal voltage > 4.70 - 5.40 V			• 2 DCY	Check the EVAP Canis-
	System Purge Con-		• Engine speed > 80 RPM			ter Purge Regulator
	trol Valve		KEWI			ੋValve 1 - ≅N80 Refer
	Open gd ii,					gto ⇒ "3.6.11
	səso(EVAP Canis- ter Purge
	Open Operola in part					Regulator
	mercir					Checking",
P044	Evaporative	Signal voltage	EVAP purge valve Commanded Off	0.5 Sec	• 2 DCY	Check the Leak Detec-
'	System Vent Con-	Signal voltage > 4.70 - 5.40 V	Commanded Off		• 2 DCY	tion Pump - V144 Refer
	trol Circuit Open	* BUILDON			John Col.	to <u>⇒ "3.6.21</u>
		*46,11Ado.	TerWa	, Kay	Piny	<u>Leak Detec-</u> tion Pump
			Jobected by	A Nolkswagen A		V144 , Checking",
						page 191

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value		Monitoring Time Length	Frequency of checks, MIL Illum.	cedure
P044 8	Evaporative Emission System Vent Con- trol Circuit Shorted to B+ or ground	Signal current > 2.2 - 4.0 A • Short to Ground - Sig- nal voltage < 2.74 - 3.26 V		0.5 Sec _{en} AG. Volkswag		- Check the Leak Detection Pump - V144 Refer to ⇒ 3.6.21 Leak Detection Pump V144 . Checking page 191
P045 5	Evaporative Emission System Leak Detec- ted Gross Leak/No Flow	Lime for bieses are drop 1 s S Time for bieses in part or	start 12 - 65530 s	136 s	• 2 DCY	- Check the EVAP System, for Leaks Check the EVAP Canister Purge Regulator Valve 1 - N80 Refer to ⇒ "3.6.11 EVAP Canister Purge Regulator Valve ∜N80, Checking", page 171. Check the Leak Detection Pump - V144 Refer to ⇒ "3.6.21 Leak Detection Pump V144, Checking", page 191.

	T			T	T	
DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
P045 6	Evaporative Emission System Leak Detec- ted Very Small Leak		 Time after engine start 12 - 1000 s ECT 3.8 - 120 °C ECT at start 3.8 - 50.3 °C Engine off time > 21600 s Ambient air temp 3.8 - 59.3 °C Ambient air temp drop after start < 4.5 °K Intake manifold vac. > -2560 hPa Intake manifold vac. > -2560 hPa Altitude < 2700 m Veh. speed >= 0 	180 s	• once per / DCY • 2 DCY	- Check the EVAP System, for Leaks Check the EVAP Canister Purge Regulator Valve 1 - N80 Refer to ⇒ "3.6.11 EVAP Canister Purge Regulator Valve 1 N80, Checking", page 171 Check the Leak Detection Pump - V144 Refer
			 Veh speed once > 40 km/h Any drive gear Restart temp diff. > 0 K Purge valve closed LDP active 	.G. Volkswagen,	AG does not guaran	to ⇒ "3.6.21 Leak Detection Pump V144, Checking", page 191.
P045 8	Emission System Purge Con- trol Valve Circuit Low	o - 3.26 V	Commanded off • Engine speed > 80 RPM		• 2 DCY	- Check the EVAP Canister Purge Regulator Valve 1 - \$\times 1.6.11\$ EVAP Canister Purge Regulator Valve 1 N80s Checking". \$\times 1.6.11\$ Checking 1.6.11\$ Check 1.6.11\$
9 9	Evaporative Emission System Purge Con- trol Valve Circuit High	> 2.2 A LLLO DO ON	EVAP purge valve, Commanded On Engine speed > 80 RPM THOMAS THOMA		• 2 DCY	- Check the EVAP Canister Purge Regulator Valve 1 - N80 Refer to 3.6.11 EVAP Canister Purge Regulator Valve 1 N80 Checking", page 171

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	ditions	Monitoring Time Length	Frequency of checks, MIL	Diagnostic Pro- cedure
P050 A	Cold Start Idle Air Control System Perform- ance	Out of range low: • Engine speed deviation < -80 RPM Out of range high: • Engine speed deviation > 80 RPM	start > 0 sEngine speed, idleVeh speed 0 km/h	3-db58	• 2 DCY	- Check the Throttle Valve Control Module - GX3 Refer to ⇒ "3.6.28 Throttle Valve Control Module GX3, Checking". page 207.
P050 B	Cold Start Ignition Timing Per- formance	Difference be- tween com- manded spark timing vs. ac- tual value > 20%	spark retard during	10 s	• Once/ DCY • 2 DCY	- Check for any Engine Speed sensor or Ignition Coil faults and disagnose them first. If NO other codes are set, replace the Engine Control Module - J623 Refer to appropriate repair manual.
P050 1	Vehicle Speed Sen- sor Range/ Perform- ance	VSS signal < 6 MPH	Engine torque > 120 Nm Engine speed > 2800 RPM	2000 mSec.	• 2 DCY	 Check vehicle speed signal. Refer to appropriate repair manual.
P050 3	Vehicle Speed Sen- sor Intermit- tent/Erratic/ High	• Vehicle speed > 180 MPH		0.5 s	• 2 DCY	 Check vehicle speed signal. Refer to appropriate repair manual.

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time checks, MIL Length Illum.	Diagnostic Pro- cedure
D Sommercial purposes, in part or in who S	Idle Air Control System RPM Lower Than Ex- pected	Integrated engine speed deviation > 2000 RPM OR engine speed deviation > 80 RPM	 ECT, > -48 °C Time after engine start > 0 s Lambda control active 	espect to the correctness of info _{πηαίοη,}	- Check the Throttle Valve Control Module - GX3 Refer to ⇒ "3.6.28 Throttle Valve Control Module GX3, Checking", page 207 .
7	Idle Air Control System RPM High- er Than Ex- pected	• Idle speed Deviation < -80 RPM	 Engine speed, idle Vehicle speed 0 MPH Altitude < 2700 m IAT, > -48 °C ECT, > -48 °C Time after engine start > 0 s Lambda control active 	6 s Control • 2 DCY	- Check the Throttle Valve Control Module - GX3 Refer to ⇒ "3.6.28 Throttle Valve Control Module GX3, Checking", page 207.

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro-
P052 A	Cold Start Camshaft Position Timing Over-Ad- vanced	Difference between target and actual position > 6° CRK	Time after engine start >= 15.8 Engine speed >= 0 RPM Modeled oil temperature >= -13 °C Catalyst heating active Catalyst heating active	Typ _{il} Ado ₂ Aqp _{eq2}	• 2 DCY	 Check engine oil for incorrect viscosity or in need of servicing (dirty oil). Oil that is not clear in color may be causing the sensor to operate incorrectly. The engine oil must be clean and of the correct viscosity in order for the sensor to operate properly. Check the vehicle paperwork to determine what oil viscosity has been used and when the last oil change was performed. Change the engine oil if necessary. Check the Camshaft Adjustment Valve 1 - N205 - Refer to ⇒ "3.6.2 Camshaft Adjustment Valve 1 - N205 - Refer to ⇒ "3.6.2 Camshaft Adjustment Valve 1 - N205 - Refer to ⇒ "6.2 Camshaft Adjustment Valve 1 - N205 - Refer to ⇒ "6.6.2 Camshaft Adjustment Valve 1 - N205 - Refer to ⇒ "6.6.2 Camshaft Adjustment Valve 1 - N205 - Refer to ⇒ "6.6.2 Camshaft Adjustment Valve 1 - N205 - Refer to ⇒ "6.6.2 Camshaft Adjustment Valve 1 - N205 - Refer to ⇒ "6.6.2 Camshaft Adjustment Valve 1 - N205 - Refer to ⇒ "6.6.2 Camshaft Adjustment Valve 1 - N205 - Refer to ⇒ "6.6.2 Camshaft Adjustment Valve 1 - N205 - Refer to ⇒ "6.6.2 Camshaft Adjustment Valve 1 - N205 - Refer to ⇒ "6.6.2 Camshaft Adjustment Valve 1 - N205 - Refer to ⇒ "6.6.2 Camshaft Adjustment Valve 1 - N205 - Refer to
P053 F	Cold Start Fuel Pres- sure Per- formance	Difference between target pressure vs actual pressure: > 1.50 MPa OR <-1.50 MPa	 Time after engine start 3 s Fuel cutoff not active Catalyst heating active 	3 S	• 2 DCY	- Check the Fuel Pressure Regulator Valve - N276 Refer to ⇒ "3.6.14 Fuel Pressure Regulator Valve N276, Checking", page 177.

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DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
P060 6	ECM Pro- cessor Fault	ECM internal check failure or BARO fail, ure (located in the ECM).	Key on or engine running	• 2 s	2 DCYContinuous	 Replace the Engine Con- trol Module - J623 Refer to appropri- ate repair manual.
P062 B	Internal Control Module Fuel Injec- tor Control Perform- ance	Internal logic failure f	• Engine speed > 80 RPM	2.2 s	• 2 DCY	 Replace the Engine Con- trol Module - J623 Refer to appropri- ate repair manual.
P063 8	Throttle Actuator Control Range/ Performance	 Time to close to reference point > 0.6 s and reference point 2.88% TPS 1 signal 0.40 - 0.60 V TPS 2 signal 4.20 - 4.60 V TPS 1 and TPS 2 4.82 - 5.18 V 	 Engine speed 0 RPM Vehicle speed 0 km/h ECT > 5.3 to 114.8 °C IAT > 5.3 to 143.8 °C Engine shutoff time 5 s Number of checks = 2 	0.3 to 5 s	• 2 DCY	- Check the Throttle Valve Constrol Module - GX3 Refer to ⇒ "3.6.28 Throttle Valve Control Module GX3, Checking". page 207
P064 1	Sensor Reference Voltage A Circuit Open	Signal voltage deviation > +/- 0.3 V		0.5 s	• 2 DCY	 If a related sensor volt- age code is also set, re- fer to that sensor for di- agnosis first. If no other re- lated codes set, replace the Engine Control Mod- ule - J623 Refer to ap- propriate re- pair manual.
P065 1	Sensor Reference Voltage B Circuit Open	Signal voltage deviation > +/- 0.3 V		0.5 s	• 2 DCY	 If a related sensor voltage code is also set, refer to that sensor for diagnosis first. If no other related codes set, replace the Engine Control Module - J623 - Refer to appropriate repair manual.

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	cedure
P065 7	Actuator Supply Voltage Circuit Open	Signal voltage, > 4.4 - 5.6 V Signal voltage, and the state of the state o	Relay commanden A oliver ded off Engine speed > 80 RPM	0.5 s G does not guara,	• 2 DCY	- Check the Motronic Engine Control Module Power Supply Relay - J271 Refer to ⇒ "3.6.23 Motronic Engine Control Module Power Supply Relay J271, Checking", page 195 .
P065 8	Supply Voltage Circuit Low	age, < 2.15 - 3.25 V	ded offEngine speed > 80 RPM	0.5 s	• 2 DCY	Check the Motronic Engine Control Module Power Supply Relay - J271 Refer to ⇒ "3.6.23 Motronic Engine Control Module Power Supply Relay J271 , Checking", page 195 .
P065 9	Actuator Supply Volt- age Circuit High	• Signal current > 1.1 A	Relay, comman-	0:5°S	• 2 DCY	- Check the Motronic Engine Control Module Power Supply Relay - J271 Refer to ⇒ "3.6.23 Motronic Engine Control Module Power Supply Relay J271, Checking", page 195 .
P069 7	Sensor Reference Voltage Circuit Open	Signal voltage deviation > +/- 0.3 V		0.5 s	• 2 DCY	- If a related sensor voltage code is also set, refer to that sensor for diagnosis first. If no other related codes set, replace the Engine Control Module - J623 Refer to appropriate repair manual.

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time not Length	Frequency of checks, MIL	Diagnostic Pro- cedure
P117 A		lambda control loop > 0.030 [-]	 Engine speed 1200 to 4000 RPM Modeled exhaust gas temp 350 to 1000 °C Engine load 21.8 to 99.8% 1st, 2nd, 3rd lambda control in closed loop O2S rear and heater ready, no faults 	800 s	• 2 DCY	Converter - GX11 Refer to ** "3.6.26" Oxygen Sensor 2 Before Catalytic Converter GX11 Checking", page 203
		Copyring to the Marke of commercial purp	Protected by copy	Johnsgen AG.	Kajuaji, kao haji kaji kaji kaji kaji kaji kaji kaji k	information in this ,

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure	
P12 A1	Fuel Rail Pressure Sensor In- appropri- ately Low	 Pressure control activity > 0.20 MPa Fuel trim activity < 0.80 Difference between actual pressure vs target pressure -16.38 to 16.38 MPa 	Engine speed > 600 RPM EVAP purge adaption < 22.0 ECT >= 63 °C IAT < 90 °C Lambda control closed loop Fuel cutoff not active	5 s	• 2 DCY	- Check the fuel pressure and delivery quantity. Refer to fuel system mechanical testing in ⇒ "3.1 Preliminary Check", page 9 and/ or to appropriate repair manual.	
			orinwhole, is not be supplied to the second s	gpyVolkswagen/	_A G. Volkswage <i>n A</i>	- If the actual fuel pressure does not match the scan tool reading: Check the Fuel Pressure Sensor-G247 Refer to 3.6.15 Fuel Pressure Sensor G247 Checking", page 179	
			imercial purposes, in part			G247. Checking". page 179. If the actual fuel pressure matches the scan tool reading: Check the Fuel Pressure Regulator Valve - N276 ⇒ "3.6.14 Fuel Pressure Regulator Valve N276, Checking". page 177	Middillidwin responsibility with Middle
			Po of But do Juliano inoli	Protected by cop.	.ĐA	Jegeweylo V Vahlgiydo O : Tranz	nin this of C.

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DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
P12 A2	appropri- ately High	Pressure control activity < -0.05 MPa Fuel trim activity > 1.65 Difference between target pressure and actual pressure -16.38 to 16.38 MPa	• Engine speed > 600 RPM • EVAP purge adaption < 22.0 • ECT >= 63 °C • IAT < 90 °C • Lambda control closed loop • Fuel cutoff not active	. DA nagen AG.	Julindo Sinannos	- Check the fuel pressure and delivery quantity. Refer to fuel system mechanical testing in ⇒ 3.1 Preliminary Check", page 9 and/or to appropriate repair manual. - If the actual fuel pressure does not match the scan tool reading: Check the Fuel Pressure Sensor G247 . Refer to ⇒ "3.6.15 Fuel Pressure Sensor G247 . Checking", page 179
						- If the actual fuel pressure matches the scan tool reading: Check the Fuel Pressure Regulator Valve - N276 ⇒ "3.6.14 Fuel Pressure Regulator Valve Pressure Regulator Valve N276, Checking", page 177
P12 A4	Fuel Rail Pump Con- trol Valve Stuck Closed	 Fuel trim activity .90 to 1.15 Pressure control activity < -6 MPa System Deviation < 16.38 MPa 	 Engine speed > 600 RPM EVAP purge adaption < 22.0 ECT >= 63 °C IAT < 90 °C Lambda control closed loop Fuel cutoff not active 	5 s	• 2 DCY	- Check the Fuel Pressure Regulator Valve - N276 Refer to ⇒ "3.6.14 Fuel Pressure Regulator Valve N276, Checking", page 177.

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
P13 EA	Cold Start Ignition Timing Per- formance Off Idle	Difference be- tween com- manded spark timing vs. ac- tual value > 40%	 Time during catalyst heating > 12 s Commanded spark retard during catalyst heating < 100% Idle speed not active Vehicle speed >= 5 km/h Delta engine load <= 10.01% Delta engine speed <= 100 RPM 	10 s	• Once/ DCY • 2 DCY	- Check for any Engine Speed sensor or Ignition Coil faults and diagnose them first. If NO other codes are set, replace the Engine Control Module - J623 Refer to appropriate repair manual.
P150 A	Engine Off Timer Per- formance	Difference between engine off time and ECM after run time < -12 s or > 12 s	Key on after ECM after run time active Key on during ECM after run time active CAN active	_{KSW} agen AG. Vol		- If ignition off B+ is lost to ECM, this code will set. Check power and ground inputs to ECM first. Refer to Wiring Diagrams for pin locations. If all power/ grounds to ECM are present, replace the Engine Control Module - J623 Refer to appropriate repair manual.
P200 8	Intake Manifold Runner Control Cir- cuit Open	• Signal voltage 4.70 - 5.40 V	Tumble flap commanded off Engine speed > 80 RPM RPM ******************************	0.5 s	• 2 DCY	present, replace the Engine Control Module - J623 Refer to appropriate repair manual. - Check the Intake Manifold Runner Control Valve - N316 Refer to ⇒ "3.6.18 Intake Manifold Runner Control Valve N316. Checking", page 185.

9 Manifold Runner Control Circuit Low P201 Intake Aminfold Runner Control Circuit High P201 Intake 4 Manifold Runner Control Circuit High P201 Intake 4 Runner Control Circuit High P201 Intake 5 Signal current → Tumble flap commanded on Engine speed > 80 RPM P201 Intake 4 Manifold Runner Control Circuit High P201 Intake 5 Signal voltage → Engine speed > 80 RPM P201 Intake 4 Manifold Runner Position Sensor Circuit Range/Per- formance	DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro cedure
Manifold Runner Control Circuit High Signal voltage		Manifold Runner Control Cir-	Signal voltage 0 to 3.26 V	manded offEngine speed > 80		• 2 DCY	take Mani- fold Runner Control Valve - N316 Refe to ⇒ "3.6.18 li take Mani- fold Runner Control Valve N316 Checking",
P201 Intake Manifold Runner Position Sensor Circuit Manifold Runner Position Sensor - G336 - Refer to ⇒ "3.6.19 Intake Manifold Runner Position Sensor G336 Checking", page 187 P201 Intake Manifold Runner Position Sensor Circuit Range/Performance • Deviation runner flap target position > 25% • Actual position > 25% • Actual position to 100% • Adaptation ready • Actual position Sensor G336 • Checking", page 187 • Adaptation ready • Actual position Sensor G336 • Checking", page 187 • Actual position Sensor G336 • Checking", page 187 • Actual position Sensor G336 • Checking", page 187 • Actual position Sensor G336 • Checking", page 187 • Actual position Sensor G336 • Checking", page 187 • Check	0	Manifold Runner Control Cir- cuit High	> 2.20 A	manded on • Engine speed > 80 RPM		• 2 DCY	- Check the II take Mani- fold Runner Control Valve - N316 Refe to ⇒ "3.6.18 II take Mani- fold Runner Control Valve N316 Checking",
P201 Intake Manifold Runner Position Sensor Circuit Range/Performance - Actual position 0 to 100% P201 Intake Manifold Runner Position vs actual position > 25% - Actual position 0 to 100% - Flap commanded on or off or or off on or off on or off on or off or or off on or off or or or or or off or	P201 4	Intake Manifold Runner Po- sition Sen- sor Circuit	Signal voltage > 4.75 V AG. Volkswag KSWagen AG. Volkswag	en AG does not guarantee or acce	0.3 s		fold Runner Position Sensor - G336 Refer to ⇒ "3.6.19 litake Manifold Runner Position Sensor G336 . Checking",
	P201 5	Intake Manifold Runner Po- sition Sen- sor Circuit Range/Per- formance	 Deviation runner flap target position vs actual position > 25% Actual position 0 to 100% 	Flap commanded on or off Adaptation ready	1.5 s	• 2 DCY	fold Runner Position Sensor - G336 Refer to ⇒ "3.6.19 Ir take Manifold Runner Position Sensor G336 .
				DA IGHINDA VOIKEWAGEN AG.		3. Dia	gnosis and Testing

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
P201 6	Intake Manifold Runner Po- sition Sen- sor Circuit Low	• Signal voltage < 0.25 V	55 authoritied by Volkswagen AG	0.3 s	• 2 DCY	- Check the Intake Manifold Runner Position Sensor - G336 Refer to ⇒ "3.6.19 Intake Manifold Runner Position Sensor G336, Checking", page 487.
P208 8	A Camshaft Position Ac- tuator Con- trol Circuit Low	• Signal part or in part or in who have on the sign of	 Camsnart valve on Engine speed > 80 RPM 	0.5 s	• 2 DCY	- Check the Camshaft Adjustment Valve 1 - o N205 Refer to ⇒ "3.6.2 Camshaft Adjustment Valve 1 N205 . Checking", page 154 .
P208 9	A Camshaft Position Ac- tuator Con- trol Circuit High	Signal current > 2.2 A Signal current	• Camshaft valve on • Engine speed > 80 RPM		• 2 DCY	- Check the Camshaft Adjustment Valve 1 - N205 Refer to ⇒ "3.6.2 Camshaft Adjustment Valve 1 N205 , Checking", page 154 .

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	n AG. Volkswagen AG	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
P209 6	P209 Post Cata- lyst Fuel Trim Sys- tem Too	• I-portion of 2nd lambda control <	Modeled exhaust gas temp 450 to 850 °C	60's antegorace	• 2 DCY	Check the Oxygen Sensor 1 Before
		00 -0.040 [-]	-0.040 [-] • for time > 20.0 [s]	Any Cany	Catalytic Converter -	
	Of Definition		Exhaust gas mass flow 14 to 300 kg/h		Tigo IIII W	GX10 Re- fer to ⇒ "3.6.25
	whole, is no		Lambda control in closed loop, not at min or max limit		with respect	Oxygen Sensor 1 Before Catalytic
	part or i		O2S front ready, no DTC		to the cc	Converter GX10 , Checking ",
	al purposes, in p.	yst Fuel Trim Sys- tem Too Lean Journal of the control of the con	O2S rear ready, no DTC		orrectness of information	page 200 . - Check the
			HO2S heaters active			Oxygen Sensor 2 Before Catalytic Converter - GX11 Re-
	ommerc		Not in fuel cutoff, SAI off			
	Sto Standard of Co		o Spring of Ago internation of a second of the second of t	Catalyst heating not active Catalyst heating	ONAJUBURDO już	and liability with respect to the correctness of information in this cool, the correctness of the correct
						 Check the Oxygen Sen- sor 1 After Catalytic Converter - GX7 Refer to
						⇒ "3.6.24 Oxygen Sensor 1 After Catalytic Converter GX7, Checking", page 197.

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
P209 7	Post Cata- lyst Fuel Trim Sys- tem Too Rich	I-portion of 2nd lambda control > 0.040 [-]	 Modeled exhaust gas temp 450 to 850 °C Exhaust gas mass 	60 s	• 2 DCY	Check the Oxygen Sensor 1 Before Catalytic Capyeter
	RICH		flow 14 to 300 kg/h Lambda control in closed loop, not at			Converter - GX10 Re- fer to ⇒ "3.6.25
			min or max limitO2S front ready,			Oxygen Sen- sor 1 Before Catalytic
			no DTC O2S rear ready, no			Converter GX10 , Checking ",
			DTC HO2S heaters ac-			page 200 . - Check the
			Not in fuel cutoff,			Oxygen Sen- sor 2 Before Catalytic
			SAI off Catalyst heating not active			Converter - GX11 Re- fer to
						⇒ "3.6.26 Oxygen Sensor 2 Before Catalytic Converter GX11 Checking", page 203
			sauthoriseotby Volkswagen AG.	Volkswagen AG	does not guarantee o	- Check the Oxygen Sen- sor 1 After Catalytic Converter - GX7 Refer
		r in whole, is not be millied	s authorised by Volkswagen AG.			3.6.24 Oxygen Sensor FAfter Catalytic Converter GX7, Checking", page 197
P210 1	Throttle Actuator Control Motor Circuit Range/Performance	Duty cycle > 80% Deviation throttle value angles vs. calculated value 4 - 50%	-	0.5 - 5 s	• 2 DCY	- Check the Throttle Valve Control Module - GX3 Refer to ⇒ "3.6.28 Throttle
		ECM power				Valve Control Module GX3, Checking
			Protected by copyrights, Copyrights		DEWRAIO V VOTARDIVER	ing,
 82		eneric Scan Tool	Profectory	. ĐA na	Deu.	

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
P210 6	Throttle Actuator Control System - Forced Limited Power	Internal check failed	Duty cycle > 80% or deviation throttle val- ue angles vs. calcula- ted value > 4 - 50%	0.5 - 5 s	• 2 DCY	- Check the Throttle Valve Control Module - GX3- Refer to ⇒ "3.6.28 Throttle Valve Control Module GX3, Checking", page 207.
P212 2	APP Sensor 1/APP Sensor 2 Circuit D Low Input	• Signal voltage < 0.61 V	authorised by Volkswager	0.5 s	• 2 DCY	- Check the Accelerator Pedal Mod- ule - GX2 Refer to ⇒ "3.6.1 Ac- celerator Pedal Mod- ule GX2 , Checking", page 152 .
P212 3	APP Sen- sor 1/APP Sensor 2 Circuit D High Input	• Signal voltage > 4.79 V		0.5 s	• 2 DCY	- Check the Accelerator Pedal Mod- ule - GX2- Refer to ⇒ "3.6.1 Accelerator Pedal Mod- ule GX2, Checking", page 152.
P212 7	APP Sen- sor 1/APP Sensor 2 Circuit E Low Input	• Signal voltage < 0.27	To River	0.5 s	• 2 DCY	- Check the Accelerator Pedal Mod- ule - GX2- Refer to ⇒ "3.6.1 Ac- celerator Pedal Mod- ule GX2. Checking", page 152.
P212 8	APP Sensor 1/APP Sensor 2 Circuit E High Input	• Signal voltage > 2.43 V	R. O. Billigo iusi	0.5 s	• 2 DCY	Check the Accelerator Pedal Mod- ule - GX2 Refer to ⇒ "3.6.1 Ac- celerator Pedal Mod- ule GX2, Checking", page 152 .

		Val	Nolks.	os not ous		•	
	DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	್ಹ Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
in part or in where	P213 8 8 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9	APP Sensor 1/APP Sensor 2 Circuit D/E Voltage Correlation	• Signal voltage: Difference between signal APP1 and APP2 > 0.17 - 0.70 V	 Signal voltage sensor 1 > 445.0 mv Signal voltage sensor 2 > 445.0 mv 	0.24, s liability with respect to the corre	• 2 DCY	- Check the Accelerator Pedal Mod- ule - GX2 Refer to ⇒ "3.6.1 Ac- celerator Pedal Mod- ule GX2, Checking", page 152 .
sial purposes	P214 6	Fuel Injec- tor Group A Supply Volt- age Circuit	• Signal current, < 2.6 A	• Engine speed > 80 RPM or	io	• 2 DCY	Check the Fuel Injectors . Refer to
),, (eor comme	Open	• Signal current > 14.90 A	current > 2.70 A	ss of information in this		"3.6.13 Fuel Injectors, Checking", page 175
	P214 9	tor Group B Supply Volt-	• Signal current, < 2.6 A	• Engine speed > 80 RPM	0.5 \$	• 2 DCY	 Check the Fuel Injectors . Refer to
		age Gircuit Open 46 _{U/\do.}	• Signal current > 14.90 A	Low side signal Low current > 2.70 A			"3.6.13 Fuel Injectors, Checking", page 175.
	P217 7	System too lean @ part load	Adaptive val- ue > 28%	 Engine speed 1280 to 6000 RPM Engine load 20 to 100% Mass air flow 30 to 300 kg/h ECT > 63 °C 	10 s	• 2 DCY	- Check the Fuel Injectors . Refer to 3.6.13 Fuel Injectors, Checking', page 175 . - Check the
				 IAT < 90 °C Lambda control closed loop Evap purge valve closed 			Oxygen Sensor 1 Before Catalytic Converter - GX10 Refer to ⇒ "3.6.25 Oxygen Sensor 1 Before Catalytic
							Converter GX10 , Checking ", page 200 .
							 Check the intake system visually for leaks (false air).
							 Check the vacuum lines visually for leaks.

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
P217 8	System Too Rich Off Idle	Adaptive val- ue < -21%	Engine speed 1280 to 6000 RPM	10 s	• 2 DCY	Check the Fuel Injec-
			• Engine load 20 to 100%			tors . Refer to ⇒ <u>"3.6.13 Fuel</u>
			Mass air flow 30 to 300 kg/h ECT > 63 °C	wagen AG does r	ot guarantee or accept	Injectors, Checking", page 175
		ith	ECT > 63 °C		oda _{rantee}	page 175.
		11/1855 200	• IAT < 90 °C		of accept	Check the Oxygen Sen-
		ilio di	Lambda control classed loop	7		
		01,001,001,001	Evap purge valve			Catalytic Converter - GX10 Re-
		6,1871	closed			fer to ⇒ 53.6.25
		who,				Oxygen Sen- sor 1 Before
		rtorii				Catalytic Converter
		in pa				GX10, Checking ",
		Copyright of Commercial purposes, in part or in whole, is not being the part of the whole, is not being the part of the part o				page 200 .
		nd lei				 Check the EVAP Canis-
		ımero				terPurge
		orcom				Valve 1 -
		ole ville				Valve 1 - N80 Refer to ⇒ "3.6.11
		4010U	,		nugui	
		"Ado3 71		9	Copyright	ter Purge Regulator
			OUNTOO NAME OF THE OFFICE OFFI		OVERTICOOPITERI	Valve 1 N80, Checking",
			Protected	. DA Nagen AG.		page 171

DTC I	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
P218 C 1 S	Sage Cooling System Perform- ance	teria and Thresh-	 ters with Enable Conditions Begin of air mass integration when engine temp > 30 ° C ECT at start, - 7 - 64 °C Ambient air temp -7 °C Fuel cutoff not active and engine load 0 - 400% Delta ambient pressure < 1.5 kPa Integrated air mass depending on engine temp at start and ambient air temperature 4 - 23 kg/h Accumulated fuel cutoff < 40 - 250 s At time of fault decision Average mass air flow 20 - 154 kg/h 	Time Length 2 s	• 2 DCY	- Check Engine Coolant Temperature Sensor - G62 - Refer to ⇒ "3.6.8 Engine Coolant Temperature Sensor G62 Checking", page 166 . - Check Engine Coolant Temperature Sensor On Radiator Outlet - G83 - Refer to ⇒ "3.6.9 Engine Coolant Temperature Sensor On Radiator Outlet G83 ", page 168 . - Check Engine Coolant Temperature Sensor On Radiator Outlet G83 ", page 168 . - Check Engine Coolant Temperature Sensor On Radiator Outlet - G83 - Refer to ⇒ "3.6.9 Engine Coolant Temperature Sensor On Radiator Outlet G83 ", page 168 . - Check the Coolant Temperature Sensor On Radiator Outlet G83 ", page 168 . - Check the Coolant Temperature Sensor On Radiator Outlet G83 ", page 168 . - Check the Coolant Temperature Sensor On Radiator Outlet G83 ", page 168 . - Check the Coolant Temperature Sensor On Radiator Outlet G83 ", page 168 . - Check the Coolant Temperature Sensor On Radiator Outlet G83 ", page 168 . - Check the Coolant Temperature Sensor On Radiator Outlet G83 ", page 168 . - Check the Coolant Circulation Pump Relay - J151 After Rum Coolant Circulation Pump Relay - V51 Refer to San Refer to S

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
						Check the Coolant Thermostat. Refer to appropriate repair manual.
P218 4	Engine Coolant Tempera- ture Sensor 2 Circuit Low	• ECT outlet > 141 °C		2 s	• 2 DCY	- Check Engine Coolant Temperature Sensor On Radiator Outlet - G83- Refer to ⇒ "3.6.9 Engine Coolant Temperature Sensor On Radiator Outlet G83 ", page 168 .
P218 5	Engine Coolant Tempera- ture Sensor 2 Circuit High	• ECT outlet < -43 °C	edunes authorised by Volkswag	2 s	• 2 DCY	- Check Engine Coolant Temperature Sensor On Radiator Outlet - G83 Refer to ⇒ 3.6.9 Engine Coolant Temperature Sensor On Radiator Outlet G83", page 168 .
		or commercial purposes, in part or in who	Egdunes authorised by Volkswag		DA Nagawaylo V vo	spectto the correctness of information in this opposite the correctness of information in this opposite the correctness of information in the

DTC Error Message Malfunction Criteria and Threshold Value Length System Too Adaptive value > 5.02% Engine speed 520 to 1200 RPM Engine load < 17 to 45% ETC > 63 °C Lambda closed loop EVAP purge valve closed Lambda closed loop EVAP purge valve closed
take system visually for leaks (air not metered through the MAF). ECT > 63 °C IAT < 90 °C Delta part load adaptation ready Lambda closed loop EVAP purge valve closed Check the fuel Pressure Sensor G247. Refer to 36.15 Fuel Pressure Sensor G247. Checking Take Injectors. Refer to 36.15 Fuel Pressure Sensor G247. Refer to 36.15 Fuel Pressure Sensor G247. Checking Take Through the Make Through through the Make Through through the Make Through through the Make Through through
Converter GX10, Checking ", page 200.

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DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parame- ters with Enable Con- ditions	Monitoring Time Length	Frequency of checks, MIL	cedure
P218 8	System Too Rich At Idle	Adaptive val- ue < -5.02%	Engine speed 520 to 1200 RPM	10 s	• 2 DGY	Check the Fuel Pres-
		ue < -5.02%	• Engine load < 17 to 45%			
		6, is not,	Mass air flow 5 to 26 kg/h			fer to *** 3.6.15 Fuel Pres- Sure Sensor
		who,	• ECT > 63 °C			G247,
		t orin	• IAT < 90 °C			Checking", page 179
		es, in par	Delta part load adaptation ready			- Check the Fuel Injec-
		burpose	Lambda closed loop			tors . Refer to ⇒ <u>*3.6.13 Fuel</u>
		commercial	EVAP purge valve closed			Injectors, Checking", Spage 175 .
		Sophing to on commercial purpose	Jor!M		May The Mark of the Markey of	Check the Oxygen Sen- sor 1 Before Catalytic Converter - GX10 Re-
			Protected by Copu	.DA nageweylo	Kan	Oxygen Sensor 1 Before Catalytic Converter GX10,
						Checking ", page 200 .
						EVAP Canis- ter Purge Regulator
						Valve 1 - N80 Refer to
						⇒ "3.6.11 EVAP Canis- ter Purge Regulator Valve 1 N80,
						Checking", page 171

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
5	HO2S Sensor Signal Out of Range Lean Bank 1 Sensor 1	Delta lambda of 2nd lambda control loop > 0.080 [-]	Modeled exhaust gas temp 450 - 850 °C Delta engine load < 20% Exhaust AG Volkswa	95 s	• 2 DCY	Check the Oxygen Sensor 1 Before Catalytic Converter - GX10 Refer to
		or in whole, is not serving the serving servin	Delta engine load < 20% Exhugas mass flow 14 - 300 kg/h Lambda control, 2nd lambda control, closed loop O2S front, rear	- does not g	uarantee or accepta	⇒ "3.6.25 Oxygen Sensor 1 Before Catalytic Converter GX10,
		notoerniie	O2S front, rear and heaters ready - no fault		3	Checking ", page 200 .
		In whole, is	Fuel cutoff, catalyst heating, SAI - not active			page 200 . page 200 .
			1st lambda control loop not at min or max			the correc
		pendindia	2nd lambda con- trol loop active			5
6	HO2S Sen- sor Signal Out of Range Rich	Delta lambda of 2nd lambda control loop < -0.080 [-]	• Modeled exhaust gas temp 450 - 850 °C	95 s	• 2 DCY	- Check the Oxygen Sen- sor 1 Before Catalytic Converter -
	Bank 1 Sen- sor 1	Sewala []	Delta engine load20%Exh. gas mass		auros	Converter - GX10 Re- fer to
		-20.080 [-]	flow 14 - 300 kg/h Lambda control, 2nd lambda control, closed loop	JA negswealor	Vallehugo inghugg	000.
			O2S front, rear and heaters ready - no fault	90		GX10 , Checking ", page 200
			Fuel cutoff, catalyst heating, SAI - not active			
			1st lambda control loop not at min or max			
			2nd lambda con- trol loop active			

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
P223 1	HO2S Sensor Bank 1 Sensor 1 Signal Circuit Shorted to Heater Circuit	Delta O2S signal front > 190 uA	 Engine speed, < 2700 RPM Engine load < 60% Heater duty cycle, 20 - 80% Modeled exhaust gas temp < 800.1 ° C lambda 0.95 - 1.05 Heater control, closed loop, no keep fault 	15 s _{agen} AG. Volksw	• 2 DCY	- Check the Oxygen Sensor 1 Before Catalytic Converter - GX10Refer to ⇒ "3.6.25 Oxygen Sensor 1 Before Catalytic Converter GX10, Checking ", page 200.
P223 7	HO2S Sensor Positive Current Control Circuit Open Bank 1 Sensor 1	O2S signal front 1.49 - 1.51 V Delta lambda controller > 0.10 Delta lambda controller > 0.10	O2\$ ceramic temp, 715 °C Lambda control, Closed loop Modeled exhaust gas temp > 700 °C Lambda modulation > 0.02 Heater control closed loop	5 to 8 s	• 2 DCY	- Check the Oxygen Sensor 1 Before Catalytic Converter GX10- Refer to ⇒ "3.6.25 Oxygen Sensor 1 Before Catalytic Converter GX10, Checking ", page 200
P224 3	HO2S Sensor Reference Voltage Circuit Open Bank 1 Sensor 1	O2S signal front > 3.25 V and Internal resistance > 1000 Ohm O2S signal front < 0.30 V and Internal resistance > 1000 Ohm O3S signal front < 10.30 V and Internal resistance > 1000 Ohm	• Heater control active	20 s	• 2 DCY	- Check the Oxygen Sensor 1 Before Catalytic Converter - GX10Refer to ⇒ "3.6.25 Oxygen Sensor 1 Before Catalytic Converter GX10 Checking ", page 200 .
P225 1	HO2S Sen- sor Nega- tive Current Control Cir- cuit Open Bank 1 Sen- sor 1	O2S signal front 1.47 to 1.53 V and in- ternal resist- ance > 1000 Ohm	 Modeled exhaust gas temp < 700 °C No fuel cutoff > 2 s Heater control active 	25 s	• 2 DCY	- Check the Oxygen Sensor 1 Before Catalytic Converter - GX10Refer, to ⇒ "3.6.25 Oxygen Sensor 1 Before Catalytic Converter GX10, Checking ", page 200.

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
0	HO2S Sen- sor Signal Stuck Lean Bank 1 Sen- sor 2	rear < -2.00 mV • Enrichment after stuck lean 27.9%	 Mass air flow 25 to 150 kg/h Modeled exhaust gas temp > 350 °C HO2S readiness > 30 s 2nd lambda control closed loop 		• 2 DCY	- Check the Oxygen Sensor 2 Before Catalytic Converter - GX11 Refer to ⇒ "3.6.26 Oxygen Sensor 2 Before Catalytic Converter GX11 Checking", page 203 .
1	HO2S Sensor Signal Stuck Rich Bank 1 Sensor 2	Sensor voltage of >= 0.15 V After oxygen mass flow > 3000 mg Number of checks >= 1	Time of fuel cutoff <= 90 s AG. Volkswagen AG Time after last fuel cutoff >= 20 s HO2S rear ready Exhaust temp at sensor >= 385 °C Exhaust mass flow > 12 kg/h Exhaust mass flow dynamic within range -80 to 80 kg/h	10 s	2 DCY 3 accept and liability with respect to the	- Check the Oxygen Sensor 2 Before Catalytic Converter - GX11 Refer to ⇒ "3.6.26 Oxygen Sensor 2 Before Catalytic Converter GX11 Checking", page 203.
	HO2S Sensor Signal Stuck Lean Bank 1 Sensor 3	O2S rear signal not oscillating at reference < 0.62 to 0.65 V For ichment	 Mass air flow 25 to 150 kg/h O2S rear readiness > 30 s Modeled exhaust gas temp > 350 °C 2nd lambda control closed loop 		• 2 DCY	- Check the Oxygen Sensor 1 After Catalytic Converter - GX7Refer, to ⇒ "3.6.24 Oxygen Sensor 1 After Catalytic Converter GX7 , Checking", page 197 .

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
P227 5	HO2S Sensor Signal Stuck Rich Bank 1 Sensor 3	O2S sensor voltage >= 0.15 V After oxygen mass flow (fuel cutoff) > 4500 mg Number of checks >= 1	 Time of fuel cutoff <= 90 s Time after last fuel cutoff >= 20 s O2S rear ready Exhaust temp at sensor >= 385 °C Exhaust mass flow > 12 kg/h Exhaust mass flow dynamic within range -80 to 80 kg/h Sensor voltage at start of measurement > 0.45 V 		• 2 DCY	- Check the Oxygen Sensor 1 After Catalytic Converter - GX7 Refer, to ⇒ "3.6.24 Oxygen Sensor 1 After Catalytic Converter GX7, Checking" page 197.
P227 9	Intake Air System Leak	Threshold to detect a defective system 1.33 - 1.60	Time after engine start > 60 sEngine load < 40%	. ĐA nag	• 2 DCY	- Check for air leaks be tween MAF and throttle body, oil-fill cap not tight or oil dipstick not seated in tube. Also any engine gaskets that can cause additional air
P229 3	Fuel Pressure Regulator 2 Performance	 Difference between target pressure vs actual pressure: > 1.50 MPa OR < -1.50 MPa 	Time after engine start 3 s Fuel cutoff not active	3.5 s	• 2 DCY	- Check the Fuel Pressure Regulator Valve - N276 Refer to ⇒ "3.6.14 Fuel Pressure Regulator Valve N276, Checking", page 177.

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
P229 4	Fuel Pressure Regulator 2 Control Circuit	Signal voltage 1.40 - 3.20 V OR NOIKEWAGEN TO Signal pattern incorrect	Commanded Off	0.5 s	• 2 DCY	- Check the Fuel Pressure Regulator Valve - N276 Refer to ⇒ "3.6.14 Fuel Pressure Regulator Valve N276, Checking", page 177.
P229 5	Fuel Pressure Regulator 2 Control Circuit	• Signal voltage 1.40 - 3.20 V	Fuel control valve, Commanded Off		$\operatorname{ct}_{\operatorname{to}}$ the correctness of $\operatorname{\it informatio}_n$	- Check the Fuel Pressure Regulator Valve - N276 Refer to ⇒ "3.6.14 Fuel Pressure Regulator Valve N276, Checking", page 177.
P229 6	sure Regu- lator 2 Con-	• Signal voltage > 3.20 V	Commanded On	Therit Copyright	• 2 DCY	- Check the Fuel Pres- sure Regula- tor Valve - N276 Refer to ⇒ "3.6.14 Fuel Pres- sure Regula- tor Valve N276. Checking", page 177.
P230 0	Ignition Coil A Primary Control Cir- cuit Low	Signal current > 24.0 mA	• Engine speed > 680 RPM	2 s	Continuous2 DCY	- Check the Ignition Coil 1 With Power Output Stage - N70 Refer to ⇒ "3.6.16 Ignition Coils With Power Output Stage Checking", page 181.

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
P230 1	Ignition Coil A Primary Control Cir- cuit High	• Signal voltage > 5.1 - 7.0 V	• Engine speed > 680 RPM	2 s	Continuous2 DCY	- Check the Ignition Coil 1 With Power Output Stage - N70 Refer to ⇒ "3.6.16 Ignition Coils With Power Output Stage, Checking", page 181.
3	Ignition Coil B Primary Control Cir- cuit Low	> 24.0 mA	680 RPM	2 s	Continuous2 DCY	- Check the Ignition Coil 2 With Power Output Stage - N127 Refer to ⇒ "3.6.16 Ignition Coils With Power Output Stage, Checking", page 181.
4	Ignition Coil B Primary Control Cir- cuit High	Signal voltage Solver Signal voltage Solver Signal voltage Signal	Engine speed >	2 s	Continuous2 DCY	- Check the Ignition Coil 2 With Power Output Stage - N127 Refer to ⇒ "3.6.16 Ignition Coils With Power Output Stage, Checking", page 181.
P230 B 6	Ignition Coil C Primary Control Cir- cuit Low	• Signal current > 24.0 mA	Engine speed > 680 RPM Remade Annual Properties	-	1 0	- Check the Ignition Coil 3 With Power Output Stage - N291 Refer to ⇒ "3.6.16 Ignition Coils With Power Output Stage Checking", page 181.
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DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
P230 7	Č Primary Control Cir- cuit High	> 5.1 - 7.0 V	680 RPM	2 s	Continuous2 DCY	- Check the Ignition Coil 3 With Power Output Stage - N291- Refer to ⇒ "3.6.16 Ignition Coils With Power Output Stage Checking", page 181
P230 9	D Primary Control Cir- cuit Low	> Ž4.0 mA	680 RPM	2 s	Continuous 2 DCY	- Check the Ignition Coil 4 With Power Output Stage - N292 Refer to ⇒ "3.6.16 Ignition Coils With Power Output Stage, Checking", page 181 .
P231 0	Ignition Coil D Primary Control Cir- cuit High	• Signal voltage > 5.1 - 7.0 V	680 RPM	2 s agen AG. Volksw	• Continuous	- Check the Ignition Coil 4 With Power Output Stage - N292 Refer to ⇒ "3.6.16 Ignition Coils With Power Output Stage. Checking". page 181
P240 A		• Signal voltage > 4.70 - 5.40 V	EVAP pump heat- er commanded Off	0.5 Sec	• 2 DCY	- Check the Leak Detection Pump - V144 Refer to ⇒ "3.6.21 Leak Detection Pump V144 . Checking", page 191 .
P240 B		Signal voltage	EVAP pump heater commanded Off Partition of the commande	0.5 Sec	• 2 DCY	Leak Detection Pump V144 Refer to ⇒ "3.6.21 Leak Detection Pump

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
P240 C		• Signal current > 2.2 - 4.0 A	EVAP pump heat- er commanded ON	0.5 Sec	• 2 DCY	- Check the Leak Detection Pump - V144 Refer to ⇒ "3.6.21 Leak Detection Pump V144, Checking", page 191.
P240 0	Evaporative Emission System Leak Detec- tion Pump Control Cir- cuit Open	• Signal voltage > 4.4 - 5.6 V	 LDP Commanded off Engine speed, 80 RPM 	0.5 s	• 2 DCY	 Check the Leak Detection Pump - V144 Refer to ⇒ "3.6.21 Leak Detection Pump V144 . Checking", page 191 .
P240 1	Evaporative Emission System Leak Detec- tion Pump Control Cir- cuit Short to Ground	> 2̃.15 - 3.25 V	 LDP Commanded Off Engine speed, 80 RPM RPM AG. Volks 	0.5 s wagen AG does /	• 2 DCY	- Check the Leak Detection Pump - V144 Refer to ⇒ "3.6.21 Leak Detection Pump V144 . Checking", page 191
P240 2	Emission System Leak Detec-	• Signal current > 3 A	LDP Commanded OnEngine speed, 80	0.5 s	• 2 DCY	- Check the Leak Detection Pump - V144- Refer to \$\frac{3}{2}\$ = *3.6.21 Leak Detection Pump V144. Checking*
		Ophiliage of commercial purpases, in part or in whole	Protected by Copyright	.DA negewa.	MOVED TO SHOW THEN	page ss of information in this cool.

P240 3		old Value	ters with Enable Con- ditions	Time Length	checks, MIL Illum.	Diagnostic Pro- cedure		
	System Leak Detec- tion Pump Sense Cir-	 Low signal voltage > 0.5 s 	Time after engine start 5.0 - 65530	0.5 s	Once/ DCY	 Check the Leak Detec- 		
			• ECT 5 - 120 °C		• 2 DCY	tion Pump - V144 Refer to ⇒ "3.6.21 Leak Detec-		
		n Pump FCT at start 5 - 50	• ECT at start 5 - 50 °C					
	July Opon				tion Pump V144,			
			• Altitude < 2700 m			Checking", page 191		
			 Integrated purge flow > 12 g 					
			Restart temp diff > 0 °K					
			 Veh speed >= 0 km/h 					
			 Veh speed ones > 30 km/h 					
			Any drive gear					
			EVAP purge valve ready, no faults					
			LDP commanded off					
P240 4	Evaporative Emission	High signal voltage > 12 s	Time after engine start 12 - 65530	12 -151 s	Once / DCY	Check the Leak Detec-		
	System Leak Detec-	Number of sheets = 20	• Engine off time >		• 2 DCY	tion Pump - V144 Refer		
	tion Pump Sense	cumulative	AG. Volkswagen AG.	does .		to ⇒ "3.6.21		
	Range/Per- formance	time of high signal voltage	• ECT at start 5 - 50 °C	S not guarantes		<u>Leak Detec-</u> <u>tion Pump</u> V144 ,		
		ing > 10 s	 Ambient air temp 5 59 °C 		accept an	Checking", page 191		
	100		• Altitude < 2700 m		Aliabilit			
	ole, is not	time of high signal voltage during pump-ing > 10 s	 Time after engine start 12 - 65530 Engine off time > 21600 PAG VOIKSWAGEN AG ECT 5 - 120 °C ECT at start 5 - 50 °C Ambient air temp 5 - 59 °C Altitude < 2700 m Intake manifold vacuum > -2560 hPa Restart temp diff > 0 °K 		Nwith res			
	or in wh		Restart temp diff > 0 °K		pection	**************************************		
	s, in part		Veh speed >= 0 km/h					
	purpose		• Veh speed ones >					
	ercial		Any drive gear		Inforn			
	Comm		EVAP purge valve ready, no faults		nationin			
	2/	Audio	 LDP commanded off 		III.OQ			
	1	eneric Scan Tool		канбик	100 j			
30 km/h • Any drive gear • EVAP purge valve ready, no faults • LDP commanded off Rep. Gr.ST - Generic Scan Tool								

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	cedure
P240 7	Evaporative Emission System Leak Detec- tion Pump Sense Cir- cuit Inter- mittent/Er- ratic	 Fluctuation of EVAP pump current during reference measurement engine off 2mA Or drop of EVAP pump current during pump phase of 3 sec > 6mA 	• ECT @ start >= 4° C • difference between ECT and AG IAT @ start <= 15K • engine off time >= 5 sec • airbag not activated • ECT @ start < 60° C • AAT < 35° C	800 Sec	2 DCY	- Check the Leak Detection Pump - V144 Refer to ⇒ "3.6.21 Leak Detection Pump V144, Checking", page 191 .
	e or commercial purposes, in part or in whole, is horbe	 Fluctuation of EVAP pump current during reference measurement engine on > 2mA Or drop of EVAP pump current during pump phase of 3 sec > 6mA 	 time since last engine start>= 600 sec intake manifold vacuum > 30 kPa delta vehicle speed < 16 mph RPM > 20 rpm front OS2 ready 		Thormation in this o	the collectness
P241 4	HO2S Sensor Exhaust Sample Error Bank 1, Sensor 1	Threshold 1 • Signal voltage 3.1 4.81 V Threshold 2 • O2S signal 2.5 - 3.2 V	 Lambda set value < 1.6 Fuel cut off, Not active Heater control, of the closed loop SAI not active O2S ceramic temp > 720 °C If low fuel signal then wait > 0 s 	15 s	• 2°DCY	- Check the Oxygen Sensor 1 Before Catalytic Converter - GX10Refer to ⇒ "3.6.25 Oxygen Sensor 1 Before Catalytic Converter GX10 , Checking ", page 200 .
P245 0	Evaporative Emission System Switching Valve Per- formance/ Stuck Open	Engine off EVAP pump current differ- ence between reference measurement to idle < 3mA	 ECT @ start >= 4° C difference between ECT and IAT @ start <= 15K engine off time >= 5 sec airbag not activated 	13.5 Sec	2 DCY	- Check the Leak Detection Pump - V144 Refer to ⇒ "3.6.21 Leak Detection Pump V144 . Checking", page 191 .

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
		Engine on EVAP pump current differ-	• ECT @ start < 60° C • AAT < 35° C	4 Sec	2 DCY	
		ence between reference measurement to idle >3mA	time since last engine start>= 600 sec			
			intake manifold vacuum > 30 kPa			
			delta vehicle speed < 16 mph			
			RPM > 20 rpm front OS2 ready	olkswagen AG do	es not guara,	
P256 8	Direct Ozone Reduction Catalyst Temperature Sensor Circuit Range/ Performance	ID check failure Temperature sensor functional check failure	Engine speed >	250 s	• 2 DCY°	- Check the CAN-Bus terminal resistance. Refer to "3.6.4 CAN-Bus Terminal Resistance, Checking", page 158.
P256 9	Direct Ozone Re- duction Cat- alyst Tem- perature Sensor Cir- cuit Low	Electrical error via LIN failure (grounded) and painting and pai		2 s	• 2 DCY	- Check the CAN-Bus terminal resistance. Refer to 3.6.4 CAN-Bus Terminal Resistance, Checking", page 158.
P257 0	Direct Ozone Re- duction Cat- alyst Tem- perature Sensor Cir- cuit High	Electrical er- ror via LIN fail- ure (short to	Protected by copyright, Co	.ĐA nage	• 2 DCY	- Check the CAN-Bus terminal resistance. Refer to 3.6.4 CAN-Bus Terminal Resistance, Checking", page 158.

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
P262 6	D	O2S signal front > 4.81 V authorised by Volkswagen authorised by Volkswagen	Modeled exhaust temp < 700 °C O2S ceramic temp AG. > 745 °C AG does Fuel cut off, Active Heater control closed loop No low fuel signal	1.5 s	• 2 DCY	- Check the Oxygen Sensor 1 Before Catalytic Converter - GX10 Refer to ⇒ "3.6.25 Oxygen Sensor 1 Before Catalytic Converter GX10, Checking ", page 200.
3	Fuel pump mechanical malfunction part in part				tiability with respect to the correctness of information in this o	- Check the Fuel Delivery Unit - GX1- / Fuel Pump Control Module - J538 Refer to ⇒ "3.6.12 Fuel Delivery Unit GX1 / Fuel Pump Control Module J538 , Checking", page 173 .
P304 4	Tuel Pump	• Signal voltage 2.15 - 3.25 V	• Engine speed > 80 RPM • Engine speed > 80	old Copyright	2 DCY	- Check the Fuel Delivery Unit - GX1- / Fuel Pump Control Module - J538 Refer to ⇒ "3.6.12 Fuel Delivery Unit GX1 / Fuel Pump Control Module J538 , Checking", page 173 .

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
P308	Engine Tempera- ture Too Low	Difference be- tween ECT and modeled ECT > 10 °K		4 s	• 2 DCY	- Check the Engine Cool- ant Temper- ature Sensor - G62 Refer to ⇒ "3.6.8 En- gine Coolant Temperature Sensor G62, Checking", page 166.
		sihoi ^{js} ed by Volkswagen A	.G. Volkswagen AG does not g	uarantee or accept an	(lab)	- Check Engine Coolant Temperature Sensor On Radiator Outlet - G83 Refer to ⇒ "3.6.9 Engine Coolant Temperature Sensor On Radiator Outlet G83 ", page 168 .
	AOU, is not				Ilability with respect to the corp	 Check the engine cool- ant thermo- stat. Refer to appropriate repair man- ual.
U000 1	CAN Com- munication	CAN message, no feedback	Time after ignition on, 500 mSec.	250 mSec.	• 2 DCY	- Check the CAN-Bus terminal resistance. Refer to
	Bus Bus Dale Die Brand Post			Office	of information in this of	3.6.4 CAN- Bus Terminal Resistance, Checking", page 158.
	High Speed CAN Com- munication Bus Per- formance	Global Time Out failure	Time after ignition on, 500 mSec.	450 mSec.	• 2 DCY	Check the CAN-Bus terminal resistance. Refer to
						⇒ "3.6.4 CAN- Bus Terminal Resistance, Checking", page 158

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
U010 1	Lost Com- munication with TCM	Time Out fail- ure. No mes- sage received by ECM	Time after ignition on, 500 mSec.	500 mSec.	• 2 DCY	- Check the CAN-Bus terminal resistance. Refer to
						⇒ "3.6.4 CAN- Bus Terminal Resistance, Checking", page 158
U012 1	Lost Com- munication With Anti- Lock Brake System (ABS) Con-	CAN communication with ABS Time Out - no message	Time after ignition on, 500 mSec.	500 mSec.	• 2 DCY	 Check the CAN-Bus terminal re- sistance. Re- fer to
	trol Module					≅ "3.6.4 CAN- Bus Terminal Resistance, Checking", page 158
U014 6	Lost Com- munication With Gate- way A	CAN communication with gateway Time Out - no message	Time after ignition on, 500 mSec.	500 mSec.	• 2 DCY	Check the CAN-Bus terminal resistance. Refer to
						"3.6.4 CAN- Bus Terminal Resistance, Checking", page 158
U015 5	Lost Com- munication With Instru- ment Panel Cluster (IPC) Con-	No CAN messages received	Time after ignition on, 500 mSec.	12000 mSec.	• 2 DCY	 Check the CAN-Bus terminal re- sistance. Re- fer to
	(IPC) Con- trol Module	es received				3.6.4 CAN- Bus Terminal Resistance, Checking", page 158
U030 2	Software In Compatibility with Transmis-sion Control Module	AT vehicle ECM coded as MT ve- hicle	Time after ignition on, 500 mSec.	5000 mSec.	• 2 DCY	Check for software updates and TSB's. Reprogram as necessary. If none are found, replace the Di-
	٠٠	orphivate or comme			in the state of th	rect Shift Gearbox (DSG) Me- chatronic -
		MOD MOIN	Protected by co	OA nepswex/loV yo	Anghigh Copyright	
_			Profector.	DA napawa	3. Diagno	osis and Testing 10

DTC	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
U040 2	Invalid Data Received From Gear Shift Con- trol Module A	Transmission Data implaysible message message in bart or in bart or	Time after ignition on, 500 mSec.	60 mSec.	• 2 DCY	- Check for software updates and TSB's. Reprogram as necessary. none are found, replace the Discontinuous (DSG) Mechatronic J743 Refer to appropriate repair manual.
U041 5	CAN Com- munication With ABS Error	 Speed sensor initialization failed Speed sensor low voltage error failed Implausible message received 	Time after ignition on, 500 mSec.	mSec.	· 2 DCY	- Check the CAN-Bus terminal resistance. Refer to 3.6.4 CAN-Bus Terminal Resistance, Checking", page 158
U042 2	Invalid Data Received From Body Control Module (IPC)	Ambient temper- ature value initial- ization failure.	Status ambient temperature from instrument cluster no fault Electrical check ambient temperature sensor no fault	2.0 s	• 2 DCY	 Check the Mass Airflow Sensor - G70 Refer to ⇒ "3.6.22 Mass Airflow Sensor G70, Checking", page 193 . If no fault is found, replace the Instrument Panel Cluster (IPC). Refer to appropriate repair
U042 3	Invalid Data Received From In- strument Panel Clus- ter Control Module	Implausible CAN message re- ceived OR ambi- ent temperature value = 00	Time after ignition on, 500 mSec.	3 s	• 2 DCY	manual. - Check the Mass Airflow Sensor - G70 Refer to ⇒ "3.6.22 Mass Airflow Sensor G70, Checking", page 193 .

	Error Mes- sage	Malfunction Cri- teria and Thresh- old Value	Secondary Parameters with Enable Conditions	Monitoring Time Length	Frequency of checks, MIL Illum.	Diagnostic Pro- cedure
U044 7	Lost Com- munication With Gate- way	CAN message implausible	Time after ignition on, 500 mSec.		• 2 DCY	 Check the CAN-Bus terminal re- sistance. Re- fer to
		*	ndes sauthorised by Volkswagen A	. 5317	AG does not guaran	3.6.4 CAN- Bus Terminal Resistance, Checking", page 158.
U102 E	Fan identifi- cation sen- sor Implau- sible signal	LIN message in correct		0.5 s	• 2 DCY	Check the LIN-Bus terminal resistance. Refer to appropriate repair manual.
U102 F	Fan identifi- cation sen- sor No Communi- cation	LIN communication time out		0.5 s	• 2 DCY	 Check the LIN-Bus terporrectness of interest ance. Reference at erepair manual.
U103 0	Local data bus Electri- cal malfunc- tion	LIN communication not active		0.5 s	• 2 DCY	 Check the LIN-Bus ter- minal resist- ance. Refer to appropri- ate repair manual.
3.5		smission DTC	Tables dule, 09M", page 105	, je.	ght by Volkswagen	, kdo ^O

Transmission DTC Tables 3.5

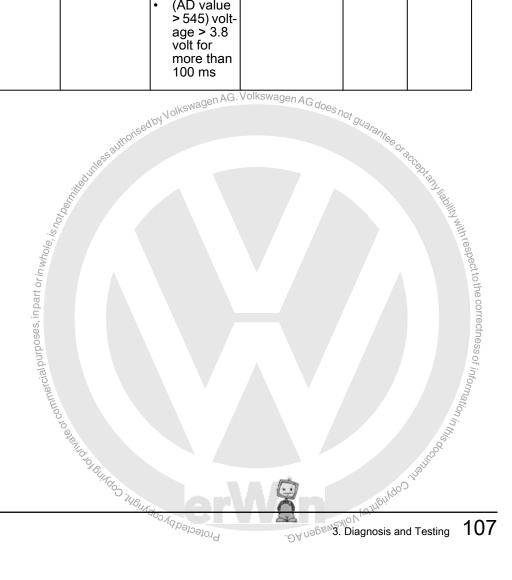
- ♦ ⇒ "3.5.1 Transmission Control Module, 09M", page 105
- ♦ "3.5.2 Transmission Mechatronic , DSG 6-spd 02E", page 122

Transmission Control Module, 09M 3.5.1

	AQ-450 09M							
DTC	Fault Code De- scription	Monitor Strat- egy Descrip- tion	Malfunction Criteria	Threshold Value	Secondary Pa- rameters with Enable Condi- tions	Monitor- ing Time Length	Frequen- cy of checks, MIL Illum	
P0604	Internal Control Module Random Access Memory (RAM) Error	RAM area check	comparison of writing data and reading data	writing da- ta is differ- ent from reading one		• 40 s	• 2 DCY	

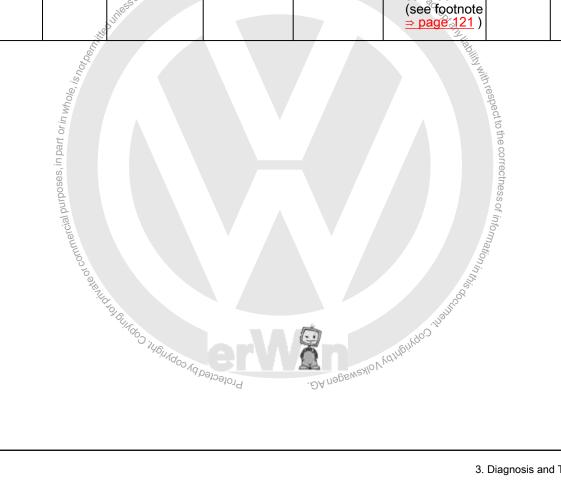
			AQ-	450 09M			
DTC	Fault Code De- scription	Monitor Strat- egy Descrip- tion	Malfunction Criteria	Threshold Value	Secondary Parameters with Enable Conditions	Monitor- ing Time Length	Frequen- cy of checks, MIL Illum
P0605	Internal Control Module Read On- ly Memo- ry (ROM) Error	ROM area check	comparison of stored checksum value and calculated checksum	two check- sum val- ues are not same		• 40 s	• 2 DCY
P0613	TCM Processor	detects mis- calculation	check-cal- culation of 1st CPU failed	single re- set does not cover problem		• XX s	• 2 DCY
P0614	ECM/ TCM In- compati- ble	CAN receive data check Nolks A. B. C and	detection Nageof error signal	transmis- gen sion cod- ing is man- ual trans- mission code (0Fh) OR max tor- que is not same as one in AT- CU	CAN bus: ACTIVE ECU communication: ACTIVE ECU data update: ACTIVE	• 250 ms	• 2 DCY
P0705	Trans- mission Range Sensor "A" Cir- cuit (PRNDL Input)	A, B, C and PA signal check in ev- ery shift lev- er position.	detection of wrong combina- tion of the A, B, C and PA signal	wrong combina- tion for more than 350 ms		350 ms	• 2 DCY
P0715	Input Tur- bine/ Speed Sensor "A" Circ	• Electrical check	• detection of wrong input AD value	• voltage < 0.2 volt (AD value < 45) for more than 100 ms OR • (AD value > 545) voltage > 3.8 volt for more than 100 ms	input sensors no failure de cision for input sensor no pulse failure ure	• 100 ms • 5 times	• 2 DCY

			AQ-	450 09M			
DTC	Fault Code De- scription	Monitor Strat- egy Descrip- tion	Malfunction Criteria	Threshold Value	Secondary Pa- rameters with Enable Condi- tions	Monitor- ing Time Length	Frequen- cy of checks, MIL Illum
P0716	Input/Turbine Shaft Speed Sensor "A" Circuit Range/ Performance	No pulse check	comparison pulse of input revolution and output revolution	no pulse of input sen- sor more than 125 ms	 engine speed > 400 rpm output sensor: ACTIVE output speed >= 300 rpm input sensor: no during failure detection or after failure decision for input sensor electrical failure 	• 125 ms • 4 times	• 2 DCY
P0720	output Shaft Speed Sensor Circuit	Electrical check	detection of wrong input AD value	voltage < 0.2 volt (AD value < 45) for more than 100 ms OR (AD value > 545) voltage > 3.8 volt for more than 100 ms	output sen- sor: no fail- ure decision for output sensor no pulse	• 100 ms • 5 times	• 2 DCY



DTC	Fault	Monitor Strat-			i		
	Code De- scription	egy Descrip- tion	Malfunction Criteria	Threshold Value	Secondary Pa- rameters with Enable Condi- tions	Monitor- ing Time Length	Frequen- cy of checks, MIL Illum
	Output Shaft Speed Sensor Circuit Range/ Perform- ance	No pulse check	comparison pulse of input revolution and output revolution	no pulse of output sensor more than 250 ms	speed: > 400 rpm input sensor: ACTIVE calculated output speed	• 250 ms • 2 times	• 2 DCY
					by input speed: >= 300 rpm • main sole-		
					noid switch: ON • gear condi-		
					tion: Engage		
					Range: D,SInhibitor switch: no fault		
	a staut	gorised by Volkswagen	AG. Volkswagen A(a does not guarantee (Inhibitor switch: no fault output sensor: no during failure detection or after failure decision for output sensor electrical failure solenoid: no fault (except S2) linear solenoid: no fault CAN bus 		
. S. N. S.	A STATE OF THE STA				sor electrical failure solenoid: no fault (except S2)		
r in whole,					linear sole- noid: no fault		
P0725	Engine Speed In-	ceive data	of error		CAN busing ACTIVE	• 250 ms	• 2 DC
purposes,	put Cir- cuit	check	signal		• ECU com munication: ACTIVE		
ormercial purposes, in pa					ECU data update AC-TIVE S		
	SEVILLA OF OFFICE				iligilido de la compania del compania del compania de la compania del compania del compania de la compania del compania de		
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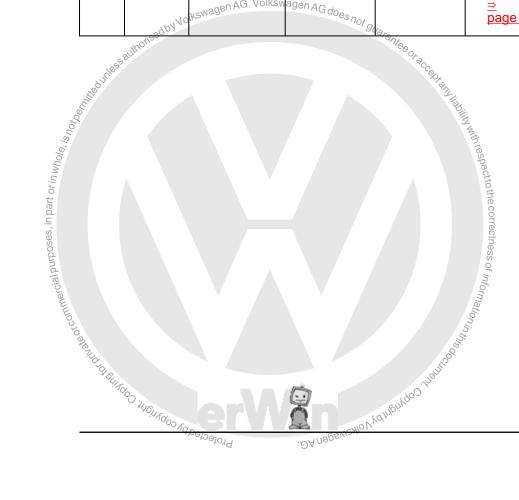
	,		AQ-	450 09M			
DTC	Fault Code De- scription	Monitor Strat- egy Descrip- tion	Malfunction Criteria	Threshold Value	Secondary Parameters with Enable Conditions	Monitor- ing Time Length	Frequen- cy of checks, MIL Illum
P0729	correct Ratio	Input and output rpm signal check. Separate error memory for each gear. Additional control of the contro	comparison of indicated slip and actual slip with stored values AG. Volksvagen AG. AG. Volksvagen AG.	 1. ABS (input revolutions – output revolutions x other gear ratio x output revolutions) for more than 1 s 2. slip differences > (0.20 x current gear ratio x output revolutions) for more than 1 s 	speed > 400 rpm • output revolutions > 250 rpm • shift lever D or S • brake: OFF • slip difference of output speed (In case ABS valid) difference < 10% • revolution sensor, no back up condition • model oil	• 1 s • 12 times	2 DCY cumulative



			AQ-	450 09M			
DTC	Fault Code De- scription	Monitor Strategy Description	Malfunction Griteriawage	Threshold Value $^{\mathrm{Ph}A_{\mathrm{G}}}_{d_{\mathrm{Oe}_{\mathrm{S}}}n_{\mathrm{Of}}_{g_{\mathcal{U}_{\mathrm{O}}_{f_{\mathrm{G}}}}}}$	Secondary Pa- rameters with Enable Condi- tions	Monitor- ing Time Length	Frequen- cy of checks, MIL Illum
	correct Ratio Rati	• Minput and output rpm signal check. Separate error memory for each gear.	• comparison of indicated slip and actual slip with stored values	• ABS (input rev – output rev x other gear ratio) < (0.04 x other gear ratio x output rev) for more than 1 s	• output revolutions > 250 rpm • estimated engine torque > 100 Nm at 1st gear > 80 Nm at 1st EB gear • shift lever D or S • brake: OFF • slip difference of output speed and ABS difference < 10% (in case of ABS fail-	• 1 s • 12 times	• 2 DCY • cumulative

			AQ-	450 09M	*12/16/		
Co sc	Fault ode De- cription	Monitor Strat- egy Descrip- tion	Malfunction Criteria	Threshold Value	Secondary Pa- rameters with Enable Condi- tions	Monitor- ing Time Length	Frequen- cy of checks, MIL Illum
or commercial purposes, in part or in which we have been in the part or in which we have been in the part or in which we have been in the part or in which we have been in the part or in which we have been in the part or in th	id to fall fall factor	Neutral condition check	• detection of slip condition	• input revolutions > output revolutions x 1st gear ratio + 400 rpm for more than 3.3 s	speed > 400 rpm • shift lever D or S • output revolutions ₹= 500 rpm • output revolutions which <= \$00 rpm calculated from ABS (In	• 2 times	cumulative but, in case of changing the shift lever position, counter = 0

			AQ-	450 09M			
DTC	Fault Code De- scription	Monitor Strat- egy Descrip- tion	Malfunction Criteria	Threshold Value	Secondary Parameters with Enable Conditions	Monitor- ing Time Length	Frequen- cy of checks, MIL Illum
	www.	Input and output rpm signal check. Separate error memory for each gear.	comparison of indicated slip and actual slip with stored values agen AG does not so	1. ABS (input revolutions – output revolutions x other gear ratio x output revolutions) for more than 1 s 2. slip differences > (0.20 x current gear ratio x output revolutions) for more than 1 s	speed > 400 rpm • output revolutions > 250 rpm • shift lever D or S • brake: OFF • slip difference of output speed (In case ABS valid) difference < 10%	• 1 s • 12 times	• 2 DCY • cumulative



			AQ-	450 09M			
DTC	Fault Code De- scription	Monitor Strat- egy Descrip- tion	Malfunction Criteria	Threshold Value	Secondary Parameters with Enable Conditions	Monitor- ing Time Length	Frequen- cy of checks, MIL Illum
P0734	Gear 4 In- correct Ratio	output rpm signal check. Sep- arate error memory for each gear.	comparison of indicated slip and actual slip with stored values Output Description Ou	1. ABS (in-put revolutions – output revolutions x other gear ratio x output revolutions) for more than 1 s 2. slip differences > (0.20 x current gear ratio x output revolutions) for more than 1 s	speed > 400 rpm • output revolutions > 250 rpm • shift lever D or S • brake: OFF • slip difference of output speed (In case ABS)	• 1 s • 12 times	• 2 DCY • cumulative
			in part commercial purposes, in part commercial purposes, in part	Ago 3;46;4go Ago ago	valid) difference < 10% • revolution sensor no gerback up condition • model oil temperature >= 0° C • common parameter, common condition (see footnote ⇒ page 121)	A negswayor	Mayufiyado Tiyautaa

	AQ-450 09M							
Co	Fault ode De- cription	Monitor Strat- egy Descrip- tion	Malfunction Criteria	Threshold Value	Secondary Pa- rameters with Enable Condi- tions	Monitor- ⊲ing⊿Time Length	Frequen- cy of checks, MIL-Illum	
cor	ear 5 In- rrect atio	Input and output rpm signal check. Separate error memory for each gear.	• comparison of indicated slip and actually stored values ues of the stored values of the sto	er gear ra- tio) < (0.04	speed > 400 rpm output revolutions > 250 rpm shift lever D or S brake: OFF slip difference of output speed (In case ABS valid) difference < 10% revolution sensor, no back up condition	-DA nagen	• 2 DCY • cumulative	
Co er Cir	rque onvert- Clutch cuit ectrical	 Input AD value check in every Lin- ear sole- noid. 	detection of wrong input AD value	 feedback current > 1333 mA (AD value > 1000) for more than 100 ms feedback current < 23 mA (AD 	main sole- noid switch: ON	• 100 ms • 5 times	• 2 DCY	
		Linear sole- noid feed- back cur- rent check	comparison of target current and feedback cur-	value < 15) for more than 100 ms sum of dif- ference of two current > 20000 Ω	linear feed- back current	• 2 times	2 DCY continuously	

			AQ-	450 09M			
DTC	Fault Code De- scription	Monitor Strategy Description		Threshold olkswa Value does	9/4 tions	Monitor- ing Time Length	Frequen- cy of checks, MIL Illum
P0748	Pressure Control Solenoid "A" Elec- trical	Input AD value check in every Linear solenoid.	detection of wrong input AD value	feedback current > 1333 mA (AD value > 1000) for more than 100 ms	The Of acceptable	• 100 ms • 5 times	• 2 DCY
	commercial purposes, in part or in whole, is no			• feedback current < 23 mA (AD value < 15) for more than 100 ms	main sole- noid switch: ON	• times • times • times	
	bommercial pul	Linear sole- noid feed- back cur- rent check	comparison of target current and feedback current	• sum of difference of two current > 20000 Ω	• Ilinear feed- back current is > 23 mA (AD:15) < 1333 mA (AD:1000)	times	2 DCY continutions ously
P0753	Shift Solenoid "A" Electrical	Conduction check in ON/ØFF solenoid	Comparison of the signal of solenoid monitor and solenoid driver output	wrong output signal for more than 100 ms - SA UDGS No.	MO Wallentgo Jifanlug	• 100 ms • 5 times	• 2 DCY
P0798	Pressure Control Solenoid "C" Elec- trical	Input AD value check in every Linear solenoid.	detection of wrong input AD value	• feedback current > 1333 mA (AD value > 1000) for more than 100 ms		• 100 ms • 5 times	• 2 DCY
				feedback current < 23 mA (AD value < 15) for more than 100 ms	main sole- noid switch: ON		
		Linear sole- noid feed- back cur- rent check	comparison of target current and feedback current	• sum of difference of two current > 20000 Ω	• linear feed- back current is > 23 mA (AD:15) < 1333 mA (AD:1000)	• 2 times	2 DCY con- tinu- ously

			AQ-	450 09M			
DTC	Fault Code De- scription	Monitor Strat- egy Descrip- tion	Malfunction Criteria	Threshold Value	Secondary Parameters with Enable Conditions	Monitor- ing Time Length	Frequen- cy of checks, MIL Illum
P0811	Exces- sive Clutch "A" Slip- page	OFF stuck check.	comparison of engine rpm and input rpm	• Engine rpm – input rpm > 100 rpm for 2 s	engine speed > 400 rpmshift lever D or S	• 2 s • 6 times	2 DCY continuously
					• engine speed < 4000 rpm		
					estimated engine tor- que >= 0 Nm		
			. Volkswagen AC	a. Volkswagen AG q	• revolution sensor, no back up con- pes dition		
		1855 authoris	adbyv		SLU target current > 1000 mA		
		Soring Market Control of the Control			• model oil temperature >= 20°C	RAN JABILIA	
	part or in w.k	• CAN com-			• common parameter, common condition (see footnote ⇒ page 121)	A and liability with respect to the corre	
P0864	nication Circuit	check	nication er- ror (all	communi- cation for more than 50 ms (In case of re- peat rate is over 25 ms, double value of re-	time: 500 ms after ignition: ON	ms (In case of repeat rate is over 50 ms,	• 2 DCY
		146, 146,	Adoo Ad Dologo John John John John John John John Joh	pear rate is used)	EWZMO VŁOŚNEJNY O JAS	of re- peat rate is used)	

			AQ-	450 09M			
DTC	Fault Code De- scription	Monitor Strat- egy Descrip- tion	Malfunction Criteria	Threshold AG. Value AG. Wagen A	tions	Monitor- ing Time Length	Frequen- cy of checks, MIL Illum
		in part or in whole, is not be miles in the state of the	detection of commu- nication er- ror (one frame which is entered in ATCU)	ECU no communication for more than 50 ms (In case of repeat rate is over 25 ms, double value of repeat rate is used)	munication: not in no	• 1000 ms (In case of repeat rate is value of repeat rate is used)	at to the correctne
		CAN receive data check CAN communication check	• ECU signal data freeze (data counter (ID488, Byte8, Bit74) not updated)	√ .ĐA,	CAN bus: ACTIVE CAN data repeat rate: the space of time between two received messages has not exceeded double the transmission cycle time	• no up- date in- five mes- sage	SSOF
		CAN com- munication check	detection of commu- nication er- ror	no ac- knowledge condition for more than 300 ms	CAN bus: ACTIVE time: 500 ms after ignition: ON	• 300 ms	
P0865	TCM Commu- nication Circuit Low	CAN com- munication check	detection of commu- nication er- ror	CAN BUS off condi- tion for more than 250 ms	time 500 ms after ignition: ON	• 250 ms	• 2 DCY
P2122	Throttle/ Pedal Po- sition Sensor/ Switch "D" Cir- cuit Low	CAN com- munication check	detection of error signal		CAN bus: ACTIVE ECU communication: ACTIVE ECU data update: ACTIVE	• 250 ms	• 2 DCY

				450 09M		1	
DTC	Fault Code De- scription	Monitor Strat- egy Descrip- tion	Malfunction Criteria	Threshold Value	Secondary Pa- rameters with Enable Condi- tions	Monitor- ing Time Length	Frequen- cy of checks, MIL Illum
P2637	Torque Manage- ment Feed- back Sig- nal "A"	CAN re- ceive data check for "signal inva- lid"	detection of error signal (0xFF)		CAN bus: ACTIVE ECU communication: ACTIVE ECU data update: ACTIVE	• 250 ms	• 2 DCY
P2716	Pressure Control Solenoid "D" Elec- trical	Input AD value check in every Linear solenoid.	detection of wrong input AD value	feedback current > 1333 mA (AD value > 1000) for more than 100 ms		• 100 ms • 5 times	• 2 DCY
				• feedback current < 23 mA (AD value < 15) for more than 100 ms	main sole- noid switch: ON	• 100 ms • 5 times	• 2 DCY
		Linear sole- noid feed- back cur- rent check of the color of the	son of tar-	• sum of difference of wagetwo current > 20000 Ω	• linear feed- back current is > 23 mA (AD:15) < (AD:1000)	• 2 times	2 DCY continu- ously
P2725	Pressure Control Solenoid "E" Elec- trical	value check in every Lin-	detection of wrong input AD value	• feedback current > 1333 mA (AD value > 1000) for more than 100 ms	ECRIPATION HARMAN	• 100 ms • 5 times	• 2 DCY
	E. trical purposes, in part or in whole, is not be in whole, is not commercial purposes. In part or in whole, is not be in whole is not be in the interest of			• feedback current < 23 mA (AD value < 15) for more than 100 ms	main sole- noid switch: ON	to the coffectioness of in	• 2 DCY
	wate or commercity	6	comparison of target current and feedback current	• sum of difference of two current > 20000 Ω	back current is > 23 mA (AD:15) < 1333 mA (AD:1000)	2 times	2 DCY continu- ously
		3 Silvato 146 Matoo Va	Protected	Jokewsgen AG.	VOMIGHION TO		

			AQ-	450 09M			
DTC	Fault Code De- scription	Monitor Strat- egy Descrip- tion	Malfunction Criteria	Threshold Value	Secondary Parameters with Enable Conditions	Monitor- ing Time Length	Frequen- cy of checks, MIL Illum
P2734	Pressure Control Solenoid "F" Elec- trical	Input AD value check in every Linear solenoid.	detection of wrong input AD value value detection value value value value value detection of wrong input AD value va	• feedback current > 1333 mA (AD value > 1000) for more than 100 ms	3317AG de	• 5 times	• 2 DCY
		n part or is	Chouse, is not be	• feedback current < 23 mA (AD value < 15) for more than 100 ms	main sole- noid switch: ON	• 100 ms • 5 times	• 2 DCY
		noid feed- back cur- rent check	son of tar- get current and feed- back cur- rent	• sum of difference of two current > 20000 Ω	(AD:15) < 1333 mA (AD:1000)	• 2 times	2 DCY continuously
Footnot	te:		to all wind to	Protected by copyrigh			III No.
♦ mair	n solenoid s	switch ON	OUISOO				100 COV
Footnote: I main solenoid switch ON I gear condition engaged S1 solenoid No fault I inhibitor switch no fault							
♦ S1 s	olenoid No	fault		Protected by co.	·DA nəb	Nolksws.	
♦ linea	ar solenoid	no fault		7			
♦ inhib	oitor switch	no fault					

Footnote:

- ♦ main solenoid switch ON
- gear condition engaged
- ♦ S1 solenoid No fault
- ♦ linear solenoid no fault
- inhibitor switch no fault
- ◆ CAN communication no fault
- ◆ ECU data update no fault
- estimated engine torque no fault
- engine speed no fault
- ◆ accelerator pedal no fault
- ◆ T/M coding and MDI max info no fault
- ♦ ROM no fault
- ♦ RAM no fault
- ◆ safety processor no fault



Transmission Mechatronic , DSG 6-spd 02E 3.5.2

	,	,	DQ-2	50 6F 02E	,		
DTC	Fault Code De- scription	Monitor Strat- egy Descrip- tion	Malfunction Criteria	Threshold Value	Secondary Pa- rameters with Enable Condi- tions	Monitor- ing Time Length	Frequen- cy of checks, MIL Illum
P0219	Engine Over- speed Condition	signal range check	rotational speed of gearbox input shaft exceed a maximum value	• rotational speed> 12000 rpm	terminal 15 voltage > 4 V for more than 500 ms		2 driv- ing cy- cles
P0501	Vehicle Speed Sensor "A" Cir- cuit Range/ Perform- ance	plausibility check	• calculate the speed of input shaft with the gear ratio of engaged gear on input shaft and the output shaft speed. compare the calculated speed with measured speed of input shaft	• speed difference magnitude > 330 rpm (output speed = 500rpm) 100 rpm (or put speed >= 20 rpm) Nows of the control of the	- shaft engag- ed	ms	2 driving cycles 2 driving cycles
20701	Trans- mission Control System Range/ Perform- ance	• signal range check	travel sensor voltage gearshift fork 1/3 out of plausibility range travel sensor voltage gearshift fork 2/4 out of plausibility range travel sensor voltage gearshift fork 5/N out of plausibility range	* voltage > 4900mV	ord .ĐA,	• 300 ms	• 2 driving cycles

			DQ-2	50 6F 02E			
DTC	Fault Code De- scription	Monitor Strat- egy Descrip- tion	Malfunction Criteria	Threshold Value	Secondary Pa- rameters with Enable Condi- tions	Monitor- ing Time Length	Frequen- cy of checks, MIL Illum
			travel sen- sor voltage gearshift fork 6/R out of plau- sibility range				
P0702	Trans- mission Control System Electrical	• plausibility check plausibility check plausibility of the plau	cut off Common High-side Switch 1 a measura- ble cur- rent. In spite of turned on Common High-side Switch 1 no current measura- ble. In spite of cut off Common High-side	off and CHS1-Current> 40 mA CHS1 turned on and CHS1-Current< 200 mA	 terminal 15 voltage < 18 V no short-circuit current check failure of CHS1 common high-side switch 1 voltage >9.2V gearbox subsystem 1 active common high-side switches not deactivated by module 2 one-time after reset terminal 15 voltage < 18 V one-time after reset terminal 15 voltage < 18 V one-time after reset terminal 25 voltage < 18 V one-time after reset terminal 25 voltage < 18 V common high-side switch 2 voltage > 9.2V gearbox subsystem 2 active common high-side switches not deactivated by module 2 	• 300 ms	2 driving cycles And respect to the correctness of information An

DQ-250 6F 02E									
DTC	Fault Code De- scription	Monitor Strat- egy Descrip- tion	Malfunction Criteria	Threshold Value	Secondary Parameters with Enable Conditions	Monitor- ing Time Length	Frequen- cy of checks, MIL Illum		
P0717	Input/Tur- bine Shaft Speed Sensor "A" Cir- cuit No	• plausibility check	calculate the speed of input shaft 1 with the gear ratio of engag-	• speed difference magnitude> 330 rpm (output speed = 500rpm) 100 rpm (output speed>=20 rpm)	ed on input shaft 1 valid CAN output speed information speed of input shaft 1 < 25 rpm output speed > 25 rpm terminal 15 voltage > 4 v for more than 500 ms battery voltage > 9 V for more than 500 ms	• 90s 90s • ms	• 2 driving cycles		

			DQ-2	50 6F 02E				
DTC	Fault Code De- scription	Monitor Strat- egy Descrip- tion	Malfunction Criteria	Threshold Value	Secondary Parameters with Enable Conditions	Monitor- ing Time Length	Frequen- cy of checks, MIL Illum	
			calculate the speed of input shaft 2 with the gear ratio of engaged gear on input shaft 2 and the output shaft speed. compare the calculated speed with measured speed of input shaft 2		 gear engaged on input shaft 2 valid CAN output speed information speed of input shaft 2 < 25 rpm output speed > 25 rpm terminal 15 voltage >4 V for more than 500 ms battery voltage > 9 V for more than 500 ms engine speed > 600 rpm for more than 500 ms 			
P0729	Gear 6 In- correct Ratio	synchronizing detection while the gearshift fork was controlled to engage sixth gear	integral that corresponds to the energy flux in the synchronization exceeds a maximum value. The integral calculation depends on synchronizing slip and duty factor of the safety valve 2		 no slipping point adaptation of clutch 2 multiplexer position = 0 control gearshift fork valve 3 >= 5% no main pressure loss terminal 15 voltage > 4 V for more than 500 ms battery voltage > 9 V for more than 500 ms engine speed > 600 rpm for more than 500 ms 	safety valve 2	alantee of acce.	oten libolity with
			¥0	Hadoo iya iya iyadoo ha pa		DA Nagen BAllo	VW Mehrogo in	

	DQ-250 6F 02E									
DTC	Fault Code De- scription	Monitor Strat- egy Descrip- tion	Malfunction Criteria	Threshold Value	Secondary Parameters with Enable Conditions	Monitor- ing Time Length	Frequen- cy of checks, MIL Illum			
P0731	Gear 1 In- correct Ratio	synchronizing detection while the gearshift fork was controlled to engage first gear	integral that corresponds to the energy flux in the synchronization exceeds a maximum value. The integral calculation depends on synchronizing slip and duty factor of the safety valve 1	• integral > 125	 no slipping point adaptation of clutch 1 multiplexer position = 0 control gearshift fork valve 1 >= 5% no main pressure loss terminal 15 voltage > 4 V for more than 500 ms battery voltage > 9 V for more than 500 ms engine speed > 600 rpm for more than 500 ms 	• syn- chron- izing slip, duty factor of safety valve 1	2 driving cycles			
P0732	Gear 2 Incorrect Ratio	ing detec- tion while the gear- shift fork was control- led to en-	integral that corresponds to the energy flux in the synchronization exceeds a maximum value. The integral calculation depends on synchronizing slip and duty factor of the safety valve 2	• integral > 125 vagen AG does not g	 no slipping point adaptation of clutch 2 multiplexer position = 1 control gearshift fork valve 3>= 5% no main pressure loss terminal 15 voltage > 4 V for more than 500 ms battery voltage > 9 V for more than 500 ms engine speed > 600 rpm for more than 500 ms 	• syn-chron-izing slip, duty factor of safety valve 2	2 driving cycles			

			DQ-2	50 6F 02E			
DTC	Fault Code De- scription	Monitor Strat- egy Descrip- tion	Malfunction Criteria	Threshold Value	Secondary Pa- rameters with Enable Condi- tions	Monitor- ing Time Length	Frequen- cy of checks, MIL Illum
P0733	Gear 3 In- correct Ratio	ing detec- tion while the gear- shift fork was control- led to en- gage third	integral that corresponds to the energy flux in the synchronization extended a maximum value. The integral calculation depends on synchronizing slip and duty factor of the safety valve 1	• integral > 125	 no slipping point adaptation of clutch 1 age multiplexer position = 0 control gearshift fork valve 2 >= 5% no main pressure loss terminal 15 voltage > 4 V for more than 500 ms battery voltage > 9 V for more than 500 ms engine speed > 600 rpm for more than 500 ms 	• syn-chron-izing slip, duty factor of safety	adility with respect to the correctness of information in
P0734	Gear 4 In- correct Ratio	synchronizing detection while the gear-shift fork was controlled to engage fourth gear	integral that corresponds to the energy flux in the synchronization exacted a maximum value. The integral calculation depends on synchronizing slip and duty factor of the safety valve 2	• integral > 125	 no slipping point adaptation of clutch 2 multiplexer position = 1 control gearshift fork valve 4 >= 5% no main pressure loss terminal 15 voltage > 4 V for more than 500 ms battery voltage > 9 V for more than 500 ms engine speed > 600 rpm for more than 500 ms 	• syn- chron- izing slip, duty factor of safety valve 2	2 driving cycles

			DQ-2	50 6F 02E			
DTC	Fault Code De- scription	Monitor Strat- egy Descrip- tion	Malfunction Criteria	Threshold Value	Secondary Pa- rameters with Enable Condi- tions	Monitor- ing Time Length	Frequen- cy of checks, MIL Illum
P0735	Gear 5 In- correct Ratio	synchronizing detection while the gearshift fork was controlled to engage fifth gear	integral that corresponds to the energy flux in the synchronization exceeds a maximum value. The integral calculation depends on synchronizing slip and duty factor of the safety valve 1	• integral > 125	 no slipping point adaptation of clutch 1 multiplexer position = 1 control gearshift fork valve 1>= 5% no main pressure loss terminal 15 voltage > 4 V for more than 500 ms battery voltage > 9 V for more than 500 ms engine speed > 600 rpm for more than 500 ms 	syn-chron-izing slip, duty factor of safety valve 1	• 2 driving cycles
P0736	Reverse Incorrect Ratio	unable to disengage the reverse gear Generic Scan Tool Generic Scan Tool	gearshift fork of reverse gear stays in age shifted position in spite of control to disengage	gearshift fork position < synchronizing point reverse gear - 10% synchronizing point measured by a basic adjustment (reverse gear stays in shifted position) control gearshift fork	 control safety valve 2 (ON) >= 20% multiplexer position = 0 desired main pressure > 2 bar no main pressure loss terminal 15 voltage > 4 V for more than 500 ms battery voltage > 9 V for more than 500 ms engine speed > 600 rpm for more than 500 ms engine speed > 600 rpm for more than 500 ms 	6000 ms CCGATGEN HEADING MITH (COSP) CCGATGEN HEADING MITH	2 driving cycles act to the correctness of inference to
		Jos Buston	746 ₁₄₆₀	V/ 9	rameing of	illalite,	
128	Rep. Gr.ST	- Generic Scan Tool	rotected by con	AG. PA	nagewagen, ,		

			DQ-2	50 6F 02E			
DTC	Fault Code De- scription	Monitor Strat- egy Descrip- tion	Malfunction Criteria	Threshold Value	Secondary Pa- rameters with Enable Condi- tions	Monitor- ing Time Length	Frequen- cy of checks, MIL Illum
on part or in wat.	Process of the state of the sta	synchronizing detection while the gear-shift fork was controlled to engage reverse gear	maximum value. The integral calculation depends on syn- chronizing slip and duty factor of the safe- ty valve 2		 no slipping point adaptation of clutch 1 multiplexer position = 0 control gearshift fork valve 4>= 5% no main pressure loss terminal 15 voltage > 4 V for more than 500 ms battery voltage > 9 V for more than 500 ms engine speed > 600 rpm for more than 500 ms 		
P0746	Pressure Control Solenoid "A" Performance/ Stuck Off	pressure integral monitoring	actual	• pressure integral>ਚ 0,1 bar*s	 desired pressure <= adapted clutch slipping point + 1 bar standing vehicle with accelerator pedal < 0.1% battery voltage > 9 V for more than 500 ms engine speed > 500 rpm 	• 300 ms	• 2 driving cycles

	DQ-250 6F 02E DTC Fault Monitor Strat- Malfunction Threshold Secondary Pa- Monitor- Frequen-										
DTC	Fault Code De- scription	Monitor Strat- egy Descrip- tion	Malfunction Criteria	Threshold Value	Secondary Pa- rameters with Enable Condi- tions	Monitor- ing Time Length	Frequen- cy of checks, MIL Illum				
		open-circuit check	desired valve current of clutch 1 exceeds a threshold simultaneous the actual valve current is smaller than a second threshold	desired current> 350 mA actual current< 50 mA	 common high-side switch 1 on, not defect and voltage > 9.2 V gearbox subsystem 1 active common high-side switches not deactivated by module 2 terminal 15 voltage > 9 V for more than 500 ms engine speed > 500 rpm 						
P0747	Control Solenoid	• pressure buildup monitoring	the number of successive pressure buildup Additional failure of clutch 1 reaches a maximum value		engaged gear on input shaft 1 desired pressure >adapted clutch slipping point - 0.2 bar. output speed < 200 rpm terminal 15 voltage > 4 V for more than 500 ms battery voltage > 9 V for more than 500 ms engine speed > 600 rpm for more than 500 ms engine speed > 600 rpm for more than 500 ms	• 0 ms	2 driving cycles				
	Š	TO TO BRAIL OF THE WOLLD	Protected by cop	. DA negs	We Mo V Walty Why V Olyco	tion in this co					

			DQ-2	50 6F 02E			
DTC	Fault Code De- scription	egy Descrip- Criteria Value		Secondary Parameters with Enable Conditions	Monitor- ing Time Length	Frequen- cy of checks, MIL Illum	
		short-circuit current check	comparison of actual valve current with desired valve current of clutch 1	actual current>desired current and (actual current- desired current)> 200 mA for more than 200 ms	switch 1 on, not defect	• 200 ms	



			DQ-2	50 6F 02E		1000	30.
DTC	Fault Code De- scription	Monitor Strat- egy Descrip- tion	Malfunction Criteria	Threshold Value	Secondary Parameters with Enable Conditions	Monitor- ing Time Length	Frequen- cy of checks, MIL Illum
P0751	Shift Solenoid "A" Performance/ Stuck Off	• open-circuits check	son of residual current of gearbox subsystem 1 (total current at common high-side switch 1 – actual current of clutch 1) at switching point of control gearshift fork valve 1 with re-	• difference of residual current<= 200 mA (supply voltage at common high-side 1=7 V) 450 mA (supply voltage at common high-side 1=13 V)	 common high-side switch 1 on, not defect and voltage > 9.2 V gearbox subsystem 1 active common high-side switches not deactivated by module 2 change of supply voltage < 1 V duty factor change of safety valve 1 is stable) <= 5% duty factor change of gearshift fork valve 2 (control of gearshift fork valve 2 is stable) <= 5% y factor change of safety valve 2 > 70% control of safety valve 2 is stable >= 50 ms duty factor change of safety valve 2 is stable >= 50 ms duty factor change of safety valve 2 is stable >= 50 ms duty factor change of safety valve 2 is stable >= 50 ms 	No Ved Morr	• 2 driving cycles

Nolkswagen AG. Volkswagen AG does not gua

P0756 Performance/ Stuck Off Shift Solenoid "B" Performance/ Stuck Off Portornance/ Stuck Off Porto	DTC Fau	14	Monitor Strat-	Malfunction	50 6F 02E	Secondary Bo	Monitor	Eregues
enoid "B" performance/ Stuck Off son of residual current<= 200 mA (supply voltage at common high-side switch 1 – actual current of clutch 1) at switching point of control gearshift fork valve 2 with residual current at permanent control of control gearshift fork valve 2 2 **Total Check** Son of residual current<= 200 mA (supply voltage at common high-side switch 1 – actual current of clutch 1) at switching point of control gearshift fork valve 2 with residual current at permanent control of control gearshift fork valve 2 **Total Check** Son of residual current<= 300 mA (supply voltage at common high-side switches not deactivated by module 2 **Common high-side switches not deactivated by module 2 **Control of safety valve 1 is stable) <= 5% **Control of safety valve 1 is stable) <= 5% **Control of safety valve 1 is stable) <= 5% **Control of safety valve 1 is stable) <= 5% **Control of safety valve 1 is stable) <= 5% **Control of safety	Code	De-	egy Descrip-		Threshold Value	Enable Condi-		checks,
duty factor of control gear-shift fork valve 2 > 70% and steady state time >= 50ms terminal 15 voltage > 9 V for more than 500 ms engine speed > 500 rpm Advantage of the state of the sta	enoid Perfor ance/	"B" m-	check	son of residual current of gearbox subsystem 1 (total current at common high-side switch 1 – actual current of clutch 1) at switching point of control gearshift fork valve 2 with residual current at permanent control of control of control gearshift fork valve gearshift	of residual current<= 200 mA (supply voltage at common high-side 1=7 V) 450 mA (supply voltage at common high-side 1=13 V)	high-side switch 1 on, not defect and voltage > 9.2 V • gearbox sub- system 1 ac- tive • common high-side switches not deactivated by module 2 • change of supply volt- age < 1 V • duty factor change of safety valve 1 (control of safety valve 1 is stable) <= 5% • duty factor change of gearshift fork valve 1 (con- trol of gear- shift fork valve 1 is sta- ble) <= 5%	ms	ing cycles

			wagen AG. Volk	swagen AG d	200		
Coc	ault de De- ription	Monitor Strat- egy Descrip- tion	Malfunction Criteria	Threshold Value	Secondary Pa- rameters with Enable Condi- tions	Monitor- ing Time Length	Frequen- cy of checks, MIL Illum
eno Peri anc	oid "C" form-	open-circuit check	son of residual current of gearbox subsystem 2 (total current at common high-side switch 2 – actual current of clutch 2) at switching point of control gearshift fork valve 3 with residual current of	• difference of residual current<= 200 mA (supply voltage at common high-side 2=7 V) 450 mA (supply voltage at common high-side 2=13 V)	 common high-side switch 2 on, not defect and voltage > 9.2 V gearbox subsystem 2 active common high-side switches not deactivated by module 2 change of supply voltage < 1 V duty factor change of safety valve 2 <= 5% (control of safety valve 2 is stable) duty factor change of gearshift fork valve 4 <= 5% (control of gearshift fork valve 4 is stable) duty factor of control gearshift fork valve 4 is stable) duty factor of control gearshift fork valve 3 > 70% and steady state time >= 50 ms terminal 15 voltage > 9 V for more than 500 ms engine speed > 500 rpm 		• 2 driving cycles

			DQ-2	50 6F 02E		872	
DTC	Fault Code De- scription	Monitor Strat- egy Descrip- tion	Malfunction Criteria	Threshold Value	Secondary Parameters with Enable Conditions	Monitor- ing Time Length	Frequen- cy of checks, ML Illum
P0766	Shift Solenoid "D" Performance/ Stuck Off	Open check Check Open commercial purposes, in part check Check	son of residual current of gearbox subsystem 2 (total current at common high-side switch 2 – actual current of clutch 2) at switching point of control gearshift fork valve	2=13 V)	 common high-side switch 2 on, not defect and voltage > 9.2 V gearbox subsystem 2 active common high-side switches not deactivated by module 2 change of supply voltage < 1 V age < 1 V a	• 300 ms	• driv- driv

DQ-250 6F 02E DTC Fault Monitor Strat- Malfunction Threshold Secondary Pa- Monitor- Free								
DTC	Fault Code De- scription	Monitor Strat- egy Descrip- tion	Malfunction Criteria	Threshold Value	Secondary Pa- rameters with Enable Condi- tions	Monitor- ing Time Length	Frequen- cy of checks, MIL Illum	
P0771	Shift Solenoid "E" Performance/ Stuck Off	• open-circuit check	son of residual current of central control (total current at common high-side switch 3 – actual current of main pressure valve and cooling oil valve) at switching point of multiplexer valve with residual current at permanent	• difference of residual current <= 150 mA (maximum of supply voltage at common high-side 1,2 and terminal 15 = 7 V) 300 mA (maximum of supply voltage at common high-side 1,2 and terminal 15 = 13 V) agen AG. Volkswag	common high-side switch 3 on and not defect no short-circuit current check failure of main pressure solenoid valve common high-side switch 1 and 2 voltage > 9.2 V common high-side switches not deactivated by module 2 change of supply voltage < 1 V multiplexer valve is controled and steady state time >= 50 ms terminal 15 voltage > 9 V for more than 500 ms engine speed > 500 rpm	Re Or Rock Ortany light	with respect to the correctness	
P0776	Pressure Control Solenoid "B" Per- for- mance/ Stuck Off	pressure integral monitoring	integral of actual pressure minus desired pressure minus drain exceeds a maximum value integral of actual pressure minus desired pressure minus drain exceeds a maximum value integral of actual pressure minus desired pressure minus drain exceeds a maximum value integral of actual pressure pressure minus desired pressure pres	• pressure integral >= 0,1 bar*s	 desired pressure <= adapted clutch slipping point + 1 bar standing vehicle with accelerator pedal < 0.1% battery voltage > 9 V for more than 500 ms engine speed > 500 rpm 	ms Signatura	• 2 driv- ling cy- cles	

			DQ-2	50 6F 02E			
DTC	Fault Code De- scription	Monitor Strat- egy Descrip- tion	Malfunction Criteria	Threshold Value	Secondary Parameters with Enable Conditions	Monitor- ing Time Length	Frequen- cy of checks, MIL Illum
		• open-circuit check	valve current of clutch 2 exceeds a threshold simultaneous the actual valve current is smaller than a second threshold	desired current> 350 mA actual current< 50 mA MA	common high-side switch 2 on, not defect and voltage > 9.2 V volkswagen AG gearbox subsystem 2 active common high-side switches not deactivated by module 2 terminal 15 voltage > 9 V for more than 500 ms engine speed > 500 rpm	not guarantee of	a Coppy and the state of the st
P0777	Pressure Control Solenoid "B" Stuck On	pressure dand legger buildup monitoring	• the number of successive pressure buildup failure of clutch 2	• counter > 2	gear on input		• 2 driving cycles

	DQ-250 6F 02E										
DTC	Fault Code De- scription	Monitor Strat- egy Descrip- tion	Malfunction Criteria	Threshold Value	Secondary Parameters with Enable Conditions	Monitor- ing Time Length	Frequen- cy of checks, MIL Illum				
		short-circuit current check	comparison of actual valve current of clutch 2	actual current >desired current and (actual current-desired current) > 200 mA for more than 200 ms	high-side switch 2 on, not defect and voltage > 9.2 V • gearbox subsystem 2 active • common high-side switches not deactivated by module 2 • terminal 15 voltage > 9 V for more than	• 200 ms	not guarantee or	· Rock			
P0781	1-2 Shift	unable to disengage the first gear	fork of first gear stays in shifted position in spite of control to disengage	gearshift fork posi- tion > syn- chronizing point first gear + 10% syn- chronizing point measured	 control safety valve 1 (ON) >= 20% multiplexer position = 0 desired main pressure > 2 bar no main pressure loss terminal 15 voltage > 4 V for more than 500 ms battery volt- 	• BA negsw	• 2 driving cycles	Trad light.			

			DQ-2	50 6F 02E			
DTC	Fault Code De- scription	Monitor Strat- egy Descrip- tion	Malfunction Criteria	Threshold Value	Secondary Pa- rameters with Enable Condi- tions	Monitor- ing Time Length	Frequen- cy of checks, MIL Illum
I part or in whole, is not being.	2-3 Shift		gearshift fork of second gear stays in shifted position in spite of control to disengage Volkswagen AG doe A goarshift	tion < synchronizing point second gear - 10% synchronizing point measured by a basic adjustment (second gear stays in shifted position) control gear-shift fork valve 4 >= 5%	battery voltage > 9 V for more than 500 ms engine speed > 600 rpm for more than 500 ms	• 6000 ms	• 2 driving cycles
ot commercial purposes	3-4 3HH	• unable to disengage the third gear	• gearshift fork of third gear stays in shifted position in spite of control to disengage	tion < syn- chronizing point third gear - 10% synchro- nizing point measured by a basic adjust- ment (third gear stays in shifted	 control safety valve 1 (ON) = 20% multiplexer position = 0 desired main pressure > 2 bar no main pressure loss terminal 15 voltage > 4 V for more than 500 ms battery voltage > 9 V for more than 500 ms engine speed > 600 rpm for more than 500 ms 	• 6000 ms	2 driving cycles

			DQ-2	50 6F 02E			
DTC	Fault Code De- scription	Monitor Strat- egy Descrip- tion	Malfunction Criteria	Threshold Value	Secondary Parameters with Enable Conditions	Monitor- ing Time Length	Frequen- cy of checks, MIL Illum
P0784	4-5 Shift	unable to disengage the fourth gear	gearshift fork of fourth gear stays in shifted position in spite of control to disengage the stational state of the state of	• gearshift fork position > synchronizing point fourth gear + 10% synchronizing point measured by a basic adjustment (fourth gear stays in shifted position) control gearshift fork valve 3 >= 5%	 control safety valve 2 (ON) >= 20% multiplexer position and position and position and pressure > 2 bar desired main pressure > 2 bar no main pressure loss terminal 15 voltage > 4 V for more than 500 ms battery voltage > 9 V for more than 500 ms engine speed > 600 rpm for more than 500 ms 	• 6000 ms	2 driving cycles 2 driving cycles
P0791	Inter- mediate Shaft Speed Sensor "A" Cir- cuit	signal range check	speed of input shaft 1 exceed a maximum value		terminal 15 voltage > 4 V for more than 500 ms Ad · SAU	• 100 ms	• 2 driving cycles cles

		authoms	DQ-2	50 6F 02E	Meeor.	
DTC	Fault Code De- scription	Monitor Strat- egy Descrip- tion	Malfunction Criteria	Threshold Value	Secondary Pa- rameters with Enable Condi- tions Monitor ing Time Length	e cy of
P0797	Control Solenoid "C" Strick On Solenoid "C" Strick On Solenoid "C" Strick On Solenoid Receipt Solenoid Recei	• short-circuit current check	son of actual valve current with desired valve current of main pressure solenoid valve	actual current>desired current and (actual current- desired current) > 200 mA for more than 300 ms actual current- desired current) > 200 mA for more than 300 ms	switch 3 on and not defect common high-side switch 1 and 2 voltage > 9.2 V common high-side switches not deactivated by module 2 terminal 15 voltage > 9 V for more than 500 ms	2 driving cycles
P0829	5-6 Shift	unable to disengage the fifth gear	gearshift fork of fifth gear stays in shifted position in spite of control to disengage	• gearshift fork position > synchronizing point fifth gear + 10% synchronizing point measured by a basic adjustment (fifth gear stays in shifted position) control gearshift fork valve 2 >= 5%	 control safety valve 1 (ON) >= 20% multiplexer position = 1 desired main pressure > 2 bar no main pressure loss terminal 15 voltage > 4 V for more than 500 ms battery voltage > 9 V for more than 500 ms engine speed > 600 rpm for more than 500 ms 	• 2 driving cycles

			DQ-2	50 6F 02E	2/18/	
DTC	Fault Code De- scription	Monitor Strat- egy Descrip- tion	Malfunction Criteria	Threshold Value	Secondary Pa- rameters with Enable Condi- tions Monitor- ing Time Length	Frequen- cy of checks, MIL Illum
	or commercial purposes, in part or in whate or commercial purposes, in part or in whate	• unable to disengage the sixth gear	• gearshift fork of sixth gear stays in shifted position in spite of control to disengage	• gearshift fork position > synchronizing point sixth gear + 10% synchronizing point measured by a basic adjustment (sixth gear stays in shifted position) control gearshift fork valve 14 2=55%	 control safety valve 2 (ON) >= 20% multiplexer position = 0 desired main pressure > 2 bar no main pressure loss terminal 15 voltage > 4 V for more than 500 ms battery voltage > 9 V for more than 500 ms engine speed > 600 rpm for more than 500 ms 	
P0840	Trans- mission Fluid Pressure Sensor/ Switch "A" Cir- cuit	signal range check	pressure sensor voltage clutch 1 out of plausibility range	voltage < 100 mVORvoltage > 4900 mV	• 300 ms	2 driv- ing cy- cles
P0841	Trans- mission Fluid Pressure Sensor/ Switch "A" Cir- cuit Range/ Perform- ance	overpres- sure moni- toring	hydraulic pressure of clutch 1 exceeds a maximum value	• pres- sure>= 15.5 bar	 signal range check is correct terminal 15 voltage > 4 V for more than 500 ms battery voltage > 9 V for more than 500 ms engine speed > 500 rpm 	2 driving cycles
P0845	Trans- mission Fluid Pressure Sensor/ Switch "B" Cir- cuit	pressure sensor volt- age clutch 2 out of plau- sibility range	pressure sensor voltage clutch 1 out of plau- sibility range	voltage < 100 mVORvoltage > 4900 mV	• 300 ms	• 2 driv- ing cy- cles

			DQ-2	50 6F 02E			4ntee Or
DTC	Fault Code De- scription	Monitor Strat- egy Descrip- tion	Malfunction Criteria	Threshold Value	Secondary Parameters with Enable Conditions	Monitor- ing Time Length	Frequency cy of checks, MIL Illum
P0846	Trans- mission Fluid Pressure Sensor/ Switch "B" Cir- cuit Range/ Perform- ance	overpressure monitoring	• hydraulic pressure of clutch 2 exceeds a maximum value	• pressure >= 15.5 bar • current > 8.5 A	 signal range check is correct terminal 15 voltage > 4 V for more than 500 ms battery voltage > 9 V for more than 500 ms engine speed > 500 rpm 	• 80 ms	2 driv- ing cy- cles
P0864	TCM Commu- nication Circuit Range/ Perform- ance	buss off de- tection of the micro- controller	4019011	Jaco by galificatory and the state of the st	terminal 15 voltage > 9 V for more than 500 ms > 500 ms af- ter reset	• 1000 ms	• 2 driv- ing cy ² cles
P0890	TCM Power Relay Sense Circuit Low	short-circuit current check	Detection by hard- ware cir- cuit	• current > 8.5 A	terminal 15 voltage > 4 V for more than 500 ms	• 200 ms	2 driv- ing cy- cles
P0914	Gear Shift Po- sition Cir- cuit	time out detection of the question and answer diagnosis	if time out of the question and answer diagnosis is detected increment an event counter	• time out threshold > 100 ms	 gear message for selector lever is transmittable and selector lever message is receivable no failure of selector lever CAN messages time after Reset > 100 ms terminal 15 voltage > 4 V for more than 500 ms 	• 300 ms	• 2 driv- ing cy- cles

			DQ-2	50 6F 02E			
DTC	Fault Code De- scription	Monitor Strat- egy Descrip- tion	Malfunction Criteria	Threshold Value	Secondary Parameters with Enable Conditions	Monitor- ing Time Length	Frequen- cy of checks, MIL Illum
		plausibility check of selector lever	selector lever posi- tion is equal to negation of the inverse selector lever posi- tion but no valid posi- tion	or Position 3 or Posi- tion 4 or Position L	 no error failure of all CAN messages no failure of selector lever CAN messages time after Reset > 1100 ms 	am Nolkawagen A	KOJUBURGO JUBU
		question and answer diagnosis	failure of question and an- swer diag- nosis			• 1500 ms	
P0919	Gear Shift Po- sition Control Error	evaluation the error signal of se- lector lever CAN mes- sage	error flag of not de- terminable selector lever posi- tion is set		 no failure of selector lever CAN messages terminal 15 voltage > 4 V for more than 500 ms battery voltage > 9 V for more than 500 ms engine speed > 500 rpm 	• 20 ms	• 2 driv- ing cy- cles

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			DQ-2	50 6F 02E			
DTC	Fault Code De- scription	Monitor Strat- egy Descrip- tion	Malfunction Criteria	Threshold Value	Secondary Pa- rameters with Enable Condi- tions	Monitor- ing Time Length	Frequen- cy of checks, MIL Illum
		validity check of se- lector lever position	if the selector lever position is equal to negation of the inverse selector lever position but is not valid (position == L, P4, P3, P2, or P1)		 no failure of selector lev- er CAN mes- sages terminal 15 voltage > 4 V for more than 500 ms 		
			AND • is not in error state (position != error) AND				
			initialization value with the initialization of flag not set then increment an event counter	_{ksw} agen AG. Volksv	vagen AG does not guar	antee or acceptan	<i>X</i>
		error detection of the question and answer diagnosis "you have to be a constant of the question and answer diagnosis" "you have the constant of the question and answer diagnosis" "you have the constant of the question and answer diagnosis" "you have the constant of the question and answer diagnosis" "you have the constant of the question and answer diagnosis" "you have the constant of the question and answer diagnosis" "you have the constant of the question and answer diagnosis" "you have the constant of the question and answer diagnosis" "you have the constant of the question and answer diagnosis" "you have the constant of the question and answer diagnosis" "you have the constant of the question and answer diagnosis" "you have the constant of the constan	if the an- swer of the diagnosis is wrong		 no failure of selector lev- er CAN mes- sages terminal 15 voltage > 4 V for more than 500 ms 	• 100 ms	ability with respect to the correc
		diagnosis, in part or	Chailigo ingingo v-	lerW	no failure of selector lever CAN messages terminal 15 voltage > 4 V for more than 500 ms	Johndo jiraho	tness of information in this co

			DQ-2	50 6F 02Ewager	AG. Volkswagen AG	loes	
DTC	Fault Code De- scription	Monitor Strat- egy Descrip- tion	Malfunction Criteria	Threshold	Secondary Parameters with	Monitor- ing Time	Frequen- cy of checks, MIL Illum
		.c.	oosition is not equal to negation of the inverse selector lever position on equals initialization tag is not set. OR • selector lever position equals initialization tag is not set. OR • selector lever position equals error value then increment an event counter		 no failure of selector lever CAN messages terminal 15 voltage > 4 V for more than 500 ms battery voltage > 9 V for more than 500 ms engine speed > 500 rpm 	• 400 ms	• 2 driv-
P0929	Gear Shift Lock Solenoid/ Actuator Control Circuit "A" Range/ Perform- ance	validity check of shiftlock po- sition signal	if the shift-lock position signal is not valid (position!= error, deactive, active or init) increment an event counter		 no failure of selector lev- er CAN mes- sages terminal 15 voltage > 4 V for more than 500 ms 	• 20 ms	• 2 driv- ing cy- cles
P2711	Unexpected Mechanical Gear Disengagement	unable to engage a gear on shaft 1	the number of successive engagements of the same gear on shaft 1 exceeds a maximum value the number of successive engage. maximum shaft 1 exceeds a maximum value	• counter>=6	 battery voltage > 9 V for more than 500 ms engine speed > 600 rpm for more than 500 ms 	• 0 ms	2 driv- ing cy- cles

		AG V	DQ-2	50 6F 02E			
DTC	Fault Code De- scription	Monitor Strat- egy Descrip- tion	Malfunction Criteria	Threshold Value	Secondary Pa- rameters with Enable Condi- tions	Monitor- ing Time Length	Frequen- cy of checks, MIL Illum
or commercial purposes, in part or in whole, is not be the strotter of the str	Burile	unable to engage a gear on shaft 2	the number of successive engagements of the same gear on shaft 2 exceeds a maximum value		A and liability with respect to the correct		
commercial purposes,	2,0,5	detect dis- engage- ment of gears on shaft 1 with- out control	In spite of a constant desired gear dis- engage- ment counter exceeds a maximum value	• counter >3	battery volt- age > 9 V for more than 500 ms engine speed > 600 rpm for more than 500 ms		
	Allego Albil	detect disengage- ment of gears on shaft 2 without control	In spite of a constant desired gear disengage ment counter exceeds a maximum value	SAMO NOTHER VOIKES	>= 12 rpm		

			DQ-2	50 6F 02E			
DTC	Fault Code De- scription	Monitor Strat- egy Descrip- tion	Malfunction Criteria	Threshold Value	Secondary Pa- rameters with Enable Condi- tions	Monitor- ing Time Length	Frequen- cy of checks, MIL Illum
	JU	• open-circuit check	current of gearbox subsystem 2 (total current at common	• residual current <= 150 mA (supply voltage at common high-side 2=7 V) 300 mA (supply voltage at common high-side 2=13 V)	 common high-side switch 2 on, not defect and voltage > 9.2 V gearbox subsystem 2 active common high-side switches not deactivated by module 2 change of supply voltage < 1 V duty factor of control gearshift fork valve 3 and <= 10 % duty factor of safety valve 2 >= 53% and steady state time >= 50 ms terminal 15 voltage > 9 V for more than 500 ms engine speed > 500 rpm 	• 300 ms	• 2 driving cycles
U010 0	Lost Commu- nication With ECM/ PCM "A"	• Timeout Check	• failure of all CAN engine messages	• time-out for more than 490 ms	 no bus off error no error failure of all CAN messages terminal 15 voltage > 9 V for more than 500 ms >500 ms after reset 	• 490 ms	• 2 driv- ing cy- cles

		Volkswage	14 do _e	107			
	arise!	gn,	DQ-2	50 6F 02E			
DTC	Fault Code De- scription	Monitor Strat- egy Descrip- tion	Malfunction Criteria	Threshold Value	Secondary Parameters with Enable Conditions	Monitor- ing Time Length	Frequen- cy of checks, MIL Illum
or commercial purposes, "I part or in whole, is not be in the interval of the		• Timeout	failure of one or more CAN engine messages (but not all CAN engine messages)	time-out for more than 1010 ms	 no bus off error no error failure of all CAN messages no error failure of all CAN engine messages terminal 15 voltage > 9 V for more than 500 ms 500 ms after reset 	• 1010 ms	
	FEINGO TUBUN	Protected by	failure of all CAN messages but gear-box is still in position to send	• time-out of for more than 2080	 terminal 15 voltage > 9 V for more than 500 ms >500 ms after reset 	• 2080 ms	
U010 3	Lost Commu- nication With Gear Shift Control Module "A"	Timeout Check	failure of selector lever CAN messages	time-out for more than 490 ms	 kein Bus off Fehler no bus off error no error fail- ure of all CAN mes- sages terminal 15 voltage > 9 V for more than 500 ms, >500 ms af- ter reset 	• 490 ms	2 driving cycles
U040 4	Invalid Data Re- ceived From Gear Shift Control Module "A"	evaluation of selector lever CAN message counter	if the value of message counter is permanent constant or change exceeds a threshold increment an event counter	maximum change of message counter > 5	 no failure of selector lev- er CAN mes- sages terminal 15 voltage > 4 V for more than 500 ms 	• 50 ms	2 driv- ing cy- cles

3.6 **Diagnostic Procedures**

- ♦ ⇒ "3.6.1 Accelerator Pedal Module GX2, Checking", page 152
- ⇒ "3.6.2 Camshaft Adjustment Valve 1 N205, Checking", page 154
- ⇒ "3.6.3 Camshaft Position Sensor G40, Checking", page 156
- ◆ ⇒ "3.6.4 CAN-Bus Terminal Resistance, Checking", page 158
- ⇒ "3.6.5 CAN-Bus Terminal Resistance, Powertrain, Check-<u>ing", page 160</u>
- ⇒ "3.6.6 Charge Air Pressure Sensor G31, Checking", page 162
- ⇒ "3.6.7 Coolant Circulation Pump Relay J151 / After-Run Coolant Pump V51 , Checking", page 164
- ♦ ⇒ "3.6.8 Engine Coolant Temperature Sensor G62, Check-<u>ing", page 166</u>
- ⇒ "3.6.9 Engine Coolant Temperature Sensor On Radiator Outlet G83 ", page 168
- ⇒ "3.6.10 Engine Speed Sensor G28, Checking", page 170
- ⇒ "3.6.11 EVAP Canister Purge Regulator Valve 1 N80 , Checking", page 171
- ⇒ "3.6.12 Fuel Delivery Unit GX1 / Fuel Pump Control Module J538 , Checking", page 173
- ♦ ⇒ "3.6.13 Fuel Injectors, Checking", page 175
- ⇒ "3.6.14 Fuel Pressure Regulator Valve N276, Checking", page 177
- ⇒ "3.6.15 Fuel Pressure Sensor G247, Checking", IKSWagen AG. Volkswagen AG does page 179
- ⇒ "3.6.16 Ignition Coils With Power Output Stage", Checking", page 181
- ◆ ⇒ "3.6.17" Intake Air Temperature Sensor G42, Checking page 183
- ⇒ \$3.6.18 Intake Manifold Runner Control Valve N316, Checking", page 185
- ⇒ "3.6.19 Intake Manifold Runner Position Sensor G336, Checking", page 187
- ⇒ "3.6.20 Knock Sensor 1 G61, Checking", page 189
- ⇒ "3.6.21 Leak Detection Pump V144, Checking", page 191
- ♦ ⇒ "3.6.22 Mass Airflow Sensor G70, Checking", page 193
- ⇒ "3.6.23 Motronic Engine Control Module Power Supply Relay J271, Checking", page 195
- ⇒ "3.6.24 Oxygen Sensor 1 After Catalytic Converter GX7, Checking", page 197
- 3.6.25 Oxygen Sensor 1 Before Catalytic Converter GX10, Checking ", page 200
- ⇒ "3:6.26 Oxygen Sensor 2 Before Catalytic Converter GX11 Checking", page 203 Mado illoinyde

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- ⇒ "3.6.27 Three Way Catalytic Converter (TWC), Checking", page 206
- ⇒ "3.6.28 Throttle Valve Control Module GX3, Checking", page 207
- ⇒ "3.6.29 Turbocharger Recirculation Valve N249, Checking", page 210
- ⇒ "3.6.30 Wastegate Bypass Regulator Valve N75 , Checking", page 211

3.6.1 Accelerator Pedal Module - GX2-, Checking

General Description

The Accelerator Pedal Position Sensor - G79- and Accelerator Pedal Position Sensor 2 - G185- are combined in one component and integrated into the Accelerator Pedal Module - GX2- . They are used to detect the position of the accelerator pedal throughout the entire adjustment range. The Engine Control Module - J623detects the driver's request from these signals and uses them to calculate the injection quantity and EPC Throttle valve operation.

The Accelerator Pedal Module - GX2- contains the following components:

- Accelerator Pedal Position Sensor G79-
- Accelerator Pedal Position Sensor 2 G185-

The Accelerator Pedal Module - GX2- components cannot be serviced separately, it must be serviced as a unit.

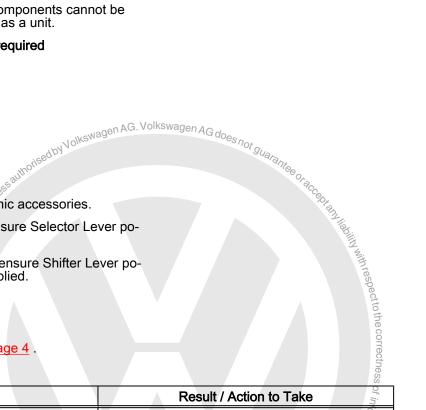
Special tools and workshop equipment required

- Multimeter.
- Wiring Diagram.
- Scan Tool.

Test requirements

- Fuses OK.
- Battery voltage OK.
- Switch OFF All electrical and electronic accessories.
- Vehicles with Auto. Transmission, ensure Selector Lever position is in "P".
- Vehicles with Manual Transmission, ensure Shifter Lever position is in "N" with Parking Brake applied.
- Observe all safety precautions: ⇒ "1.1 Safety Precautions" page 2.
- View clean working conditions: . ⇒ "1.2 Clean Working Conditions", page 4.

Step	Procedure	Result / Action to Take
1	 PERFORM: Preliminary Check to verify the customers complaint. Refer to ⇒ "3.1 Preliminary Check", page 9 Was Complaint verified? 	 YES: GO TO: Step 2 ⇒ page 153 . NO: GATHER more information from customer about the complaint.
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Step		Procedure		Result / Action to Take
2	•	CONNECT: Scan Tool.	-	YES:
	•	IGNITION: ON.	•	GO TO: Step 3 <u>⇒ page 153</u> .
	•	CHECK: Throttle valve position closed:	- ♦	NO: GO TO: Step 4 <u>⇒ page 153</u> .
	•	SPECIFIED VALUE: 3 – 25%.		
	•	DEPRESS: Accelerator pedal slowly to WOT while observing the percentage display. The percentage display must increase uniformly.		
	•	CHECK: Throttle valve position at WOT:		
	•	SPECIFIED VALUE: 84 – 97%.		
	•	IGNITION: OFF.		
	_	Was Value obtained?		
3	•	Condition may be intermittent.	*	GO TO: Step 6 ⇒ page 154 .
	•	PERFORM: Visual Inspection of wiring and component.		
	•	CHECK: Wiring for open, high resistance, short or harness connector for damage, corrosion, loose or broken terminals.		
	•	REPAIR: Faulty wiring or connector AG. Volkswa	gen	AG _{does} _{not}
4	•	DISCONNECT: Accelerator Pedal Module - GX2- harness connector.	-	YES: GO TO: Step 5 page 153 .
	•	IGNITION: ON	_	NO:
	•	CHECK: Accelerator Pedal Module - GX2- harness connector terminals 1 to 5 and 2 to 3 for voltage.	•	GO TO: Step 6 <u>⇒ page 154</u> .
	•	IGNITION: OFF.		
	•	SPECIFIED VALUE: About 5.0 V.		spec
	_	Were Values obtained?		t to th
5	•	REMOVE: Engine Control Module - J623 Refer to appropriate repair manual.	↓	YES: REPLACE: Accelerator Pedal Module - GX2
	•	CHECK: Accelerator Pedal Module - GX2- harness connector terminal 4 to the Engine Control Module - J623- harness connector T94 / 83 for resistance.	* -	Refer to appropriate repair manual. GO TO: Step 7 ⇒ page 154 NO: PERFORM: Visual Inspection of wiring and
	•	CHECK: Accelerator Pedal Module - GX2- harness connector terminal 6 to the Engine Control Module - J623- harness connector T94 / 61 for resistance.	*	component. CHECK: Wiring for open, high resistance, short or harness connector for damage, corro-
	•	SPECIFIED VALUE: 0.5Ω (± 0.3Ω).		sion, loose or broken terminals.
	_	Were Values obtained?		REPAIR: Faulty wiring or connector. GO TO: Step 7 page 154.
		- Agpan-	V	Angewealov rain.
		Profection	.6	Anspe

Procedure	Result / Action to Take
REMOVE: Engine Control Module - J623 Refer to appropriate repair manual.	 YES: GO TO: Step 7 ⇒ page 154 .
 CHECK: Accelerator Pedal Module - GX2- harness connector terminal 1 to the Engine Control Module - J623- harness connector T94 / 81 for resistance 	◆ PERFORM: Visual Inspection of wiring and
CHECK: Accelerator Pedal Module - GX2- har- ness connector terminal 2 to the Engine Con-	sion, loose or broken terminals.
for resistance.	REPAIR: Faulty wiring or connector.
 CHECK: Accelerator Pedal Module - GX2- har- ness connector terminal 3 to the Engine Con- trol Module - J623- harness connector T94 / 35 for resistance. 	◆ GO TO: Step 7 <u>⇒ page 154</u> .
 CHECK: Accelerator Pedal Module - GX2- har- ness connector terminal 5 to the Engine Con- trol Module - J623- harness connector T94 / 11 for resistance. 	
• SPECIFIED VALUE: $0.5~\Omega~(\pm~0.3~\Omega)$.	
– Were Values obtained?	
Final Procedure	YES:◆ CHECK: Engine Control Module - J623- har-
 Perform a road test to verify repair. 	ness connector for any damaged, pushed-out
– Does the original DTC return?	pins.
	♦ REPAIR: As necessary.
	◆ If all electrical connections are OK:
	REPLACE: Engine Control Module - J623 Refer to appropriate repair manual.
odby Volkswagen AG. Volkswagen AG does not	◆ Clear the DTC's. Refer to ⇒ "3.3.4 Diagnostic Mode 04 - Erase DTC Memory", page 15.
unles authorise.	 Repair is complete. Generate Readiness Code, Refer to ⇒ "3.2 Readiness Code", page 9
	♦ Return vehicle to Customer.
	 NO: ◆ Perform the diagnostic procedure for any DTC's.
	♦ If no DTC's return the repair is complete.
	♦ Return vehicle to customer.
	 REMOVE: Engine Control Module - J623 Refer to appropriate repair manual. CHECK: Accelerator Pedal Module - GX2- harness connector terminal 1 to the Engine Control Module - J623- harness connector T94 / 81 for resistance. CHECK: Accelerator Pedal Module - GX2- harness connector terminal 2 to the Engine Control Module - J623- harness connector T94 / 82 for resistance. CHECK: Accelerator Pedal Module - GX2- harness connector terminal 3 to the Engine Control Module - J623- harness connector T94 / 35 for resistance. CHECK: Accelerator Pedal Module - GX2- harness connector terminal 5 to the Engine Control Module - J623- harness connector T94 / 11 for resistance. SPECIFIED VALUE: 0.5 Ω (± 0.3 Ω). Were Values obtained? Final Procedure Perform a road test to verify repair.

3.6.2 Camshaft Adjustment Valve 1 - N205-, Checking

General Description

The camshaft's task is to operate the valves at the right time and in the right order to control the charge cycle. Camshaft adjustment using the Camshaft Adjustment Valve 1 - N205- varies the opening times of the valves to suit all operating conditions. This ensures ideal charge cycles within a wide range of engine speeds and loads. Fuel consumption and pollutant emissions are reduced, torque and smoothness increased. In engines with a double overhead camshaft the size and positioning of the valve

opening overlap can be influenced, enhancing characteristics in full-load and part-load operation. In continuous camshaft adjustment, the adjustment is infinitely variable within specific parame-

Special tools and workshop equipment required

- ♦ Multimeter.
- Wiring Diagram.
- ♦ Scan Tool.

Test requirements

- · Fuses OK.
- Battery voltage OK.
- Switch OFF All electrical and electronic accessories.
- Vehicles with Auto. Transmission, ensure Selector Lever position is in "P".
- Vehicles with Manual Transmission, ensure Chino.

 sition is in "N" with Parking Brake applied.

 Observe all safety precautions:

 ⇒ "1.1 Safety Precautions", page 2

 View clean working conditions:

 ⇒ "1.2 Clean Working Conditions", page 45 Vehicles with Manual Transmission, ensure Shifter Lever position is in "N" with Parking Brake applied.

Step	Procedure §	Result / Action to Take
1	 PERFORM: Preliminary Check to verify the customers complaint. Refer to ⇒ "3.1 Preliminary Check", page 9 Was Complaint verified? 	 YES: GO TO Step 2 ⇒ page 155 . NO: GATHER more information from customer about the complaint.
2	 IGNITION: OFF. DISCONNECT: Camshaft Adjustment Valve 1 - N205- harness connector. CHECK: Camshaft Adjustment Valve 1 - N205- component connector terminals 1 to 2 for resistance. SPECIFIED VALUE: 5 to 20 Ω (+/- 3 Ω at approx. 20° C). Was Value obtained? 	 YES: GO TO: Step 3 ⇒ page 155 . NO: REPLACE: Camshaft Adjustment Valve 1 - N205 Refer to appropriate repair manual. GO TO: Step 5 ⇒ page 156 .
3	 IGNITION: ON. CHECK: Camshaft Adjustment Valve 1 N205-harness connector terminal 1 to ground for voltage. IGNITION: OFF. SPECIFIED VALUE: Battery voltage. Was Value obtained? 	 YES: GO TO: Step page 156 NO: PERFORM: Visual Inspection of wiring and component. CHECK: Wiring for open, high resistance, short or harness connector for damage, corrosion, loose or broken terminals. REPAIR: Faulty wiring or connector. GO TO: Step 5 ⇒ page 156

Step		Procedure		Result / Action to Take
4	•	REMOVE: Engine Control Module - J623 Refer to appropriate repair manual.	-	YES: GO TO: Step 5 ⇒ page 156 .
	•	CHECK: Camshaft Adjustment Valve 1 - N205- harness connector terminal 2 to the Engine Control Module - J623- harness connector T60 / 5 for resistance.	→	component.
	-	SPECIFIED VALUE: 0.5 Ω (± 0.3 Ω). Was Value obtained?	445	CHECK: Wiring for open, high resistance, short or harness connector for damage, corrosion, loose or broken terminals. REPAIR: Faulty wiring or connector. GO TO: Step 5 = page 156.
5	•	Final Procedure Perform a road test to verify repair.		YES: CHECK: Engine Control Module - J623- har-
	_	Does the original DTC return?	•	ness connector for any damaged, pushed-out pins. REPAIR: As necessary.
		Perform a road test to verify repair. Does the original DTC return?	* *	If all electrical connections are OK: REPLACE: Engine Control Module - J623 Refer to appropriate repair manual.
		purposes, i	•	Clear the DTC's. Refer to ⇒ "3.3.4 Diagnostic Mode 04 - Erase DTC Memory", page 15
		Commercial	*	Repair is complete. Generate Readiness Code. Refer to ⇒ "3.2 Readiness Code", page 9.
		O. O	♦	Return vehicle to Customer. NO:
		·Q.	♦ SUINC	If no DTC's return the repair is complete.
			•	Return vehicle to customer.

3.6.3 Camshaft Position Sensor - G40-, Checking

General Description

Using the signal from the Camshaft Position Sensor - G40-, the precise position of the camshaft relative to the crankshaft is determined very quickly when the engine is started. Used in combination with the signal from the Engine Speed Sensor - G28-, the signal from the Camshaft Position Sensor - G40- allows the Engine Control Module - J623- to detect which cylinder is at TDC. The fuel can be injected into the corresponding cylinder and ignited.

Special tools and workshop equipment required

- Multimeter.
- Wiring Diagram.
- Scan Tool.

Test requirements

· Fuses OK.

- Battery voltage OK.
- Switch OFF All electrical and electronic accessories.
- Vehicles with Auto. Transmission, ensure Selector Lever position is in "P".
- Vehicles with Manual Transmission, ensure Shifter Lever position is in "N" with Parking Brake applied.
- Observe all safety precautions: ⇒ "1.1 Safety Precautions", page 2
- View clean working conditions: . ⇒ "1.2 Clean Working Conditions", page 4 .

• View clean working conditions: ⇒ "1.2 Clean Working Conditions", page 4 Test Procedure Who is a discontinuous and the second seco					
		Clean Working Conditions", page 4. Cedure		not guarante	
Step	_	Procedure 3655 autilities		Result / Action to Take	
1	•	PERFORM: Preliminary Check to verify the customers complaint. Refer to ⇒ "3.1 Preliminary Check", page 9 . Was Complaint verified?	- * - *	YES: GO TO: Step 2 ⇒ page 157 . NO: GATHER more information from customer	
2	•	DISCONNECT: Camshaft Position Sensor - G40- harness connector. IGNITION: ON. CHECK: Camshaft Position Sensor - G40- harness connector terminals 1 to 3 for voltage. IGNITION: OFF. SPECIFIED VALUE: About 5.0 V.	_	about the complaint. YES: GO TO: Step 3 ⇒ page 157 . NO: GO TO: Step 4 ⇒ page 157 .	
	-	Was Value obtained?			
3	•	vvas value obtaineu?	♦ Delto	YES: REPLACE: Camshaft Position Sensor-G40 Refer to appropriate repair manual. GO TO: Step 5 ⇒ page 158. NO: PERFORM: Visual Inspection of wiring and component. CHECK: Wiring for open, high resistance, short or harness connector for damage, corrosion, loose or broken terminals. REPAIR: Faulty wiring or connector. GO TO: Step 5 ⇒ page 158.	
4		REMOVE: Engine Control Module - J623 Refer to appropriate repair manual. CHECK: Camshaft Position Sensor - G40- harness connector terminal 1 to the Engine Control Module - J623- harness connector T60 / 29 for resistance. CHECK: Camshaft Position Sensor - G40- harness connector terminal 3 to the Engine Control Module - J623- harness connector T60 / 8 for resistance. SPECIFIED VALUE: 0.5 Ω (± 0.3 Ω).	**	YES: GO TO: Step 5 ⇒ page 158. NO: PERFORM: Visual Inspection of wiring and component. CHECK: Wiring for open, high resistance, short or harness connector for damage, corrosion, loose or broken terminals. REPAIR: Faulty wiring or connector. GO TO: Step 5 ⇒ page 158.	
	-	Were Values obtained?			

Step		Procedure		Result / Action to Take
5	•	Final Procedure	-	YES:
	•	Perform a road test to verify repair.	•	CHECK: Engine Control Module - J623- harness connector for any damaged, pushed-out
	-	Does the original DTC return?		pins.
			♦	REPAIR: As necessary.
			♦	If all electrical connections are OK:
		Aby Volkswagen AG. Volkswagen	♠ G	REPLACE: Engine Control Module - J623 Refer to appropriate repair manual.
		messauthoriseu	•	Clear the DTC's. Refer to ⇒ "3.3.4 Diagnostic Mode 04 - Erase DTC Memory", page 45.
		No. of the second secon	•	Repair is complete Generate Readiness Code. Refer to <u>→ "3.2 Readiness Code"</u> , page 9.
		181	•	Return vehicle to Customer.
		Does the Original DTO return: Note of the Control	*	NO: Perform the diagnostic procedure for any DTC's.
		n par	♦	If no DTC's return the repair is complete.
		OSes, ii.	♦	Return vehicle to customer

Lingine Control Module - J623- communicates with other CAN-Bus capable control modules.

The control modules are connected by two data bus wires which are twisted together (CAN_High and CAN_Low), and exchange information (messages). Missing information on the CAN-bus, is recognized as a malfunction by the Engine Control Module J623- and the other control modules connected to the CAN-bus.

Trouble-free operation of the CAN-Bus requires the minal resistance. This central terminal resistance. This central terminal resistance. This central terminal resistance control Module - J623
Special tools and

- Multimeter.
- Wiring Diagram.

- Fuses OK.
- Battery voltage OK.
- Switch OFF All electrical and electronic accessories.
- Vehicles with Auto. Transmission, ensure Selector Lever position is in "P".
- Vehicles with Manual Transmission, ensure Shifter Lever position is in "N" with Parking Brake applied.
- Observe all safety precautions: ⇒ "1.1 Safety Precautions", page 2

View clean working conditions: .

⇒ "1.2 Clean Working Conditions", page 4 .

Step	Procedure	Result / Action to Take
1	PERFORM: Preliminary Check to verify the customers complaint. Refer to *3.1 Preliminary Check", page 9 Was Complaint verified?	 YES: GO TO: Step 2 ⇒ page 159 . NO: GATHER more information from customer about the complaint.
2	 DISCONNECT: Data Bus On Board Diagnostic Interface - J533- harness connector. The Engine Control Module - J623- must remain connected for the following step. CHECK: Data Bus On Board Diagnostic Interface - J533- harness connector terminals 6 to 16 for resistance. SPECIFIED VALUE: 60 – 72 Ω (at approx. 20° C). Was Value obtained? 	short or harness connector for damage, corrosion, loose or broken terminals.
3	 REMOVE: Engine Control Module - J623 Refer to appropriate repair manual. CHECK: Data Bus On Board Diagnostic Interface - J533- harness connector terminal 6 to the Engine Control Module - J623- harness connector T94 / 67 for resistance. CHECK: Data Bus On Board Diagnostic Interface - J533- harness connector terminal 16 to the Engine Control Module - J623- harness connector T94 / 68 for resistance. SPECIFIED VALUE: 0.5 Ω (± 0.3 Ω). Were Values obtained? 	 YES: REPLACE: Engine Control Module - J623 Refer to appropriate repair manual. GO TO: Step 4 ⇒ page 160. NO: PERFORM: Visual Inspection of wiring and component. CHECK: Wiring for open, high resistance, short or harness connector for damage, corrosion, loose or broken terminals. REPAIR: Faulty wiring or connector. GO TO: Step 4 ⇒ page 160.

Step	Procedure	Result / Action to Take			
4	Final Procedure	- YES:			
	Perform a road test to verify repair.	CHECK: Data Bus On Board Diagnostic Interface - J533- harness connector for any dam-			
	Does the original DTC return?	aged, pushed-out pins.			
	_	♦ REPAIR: As necessary.			
		◆ Clear the DTC's. Refer to ⇒ "3.3.4 Diagnostic Mode 04 - Erase DTC Memory", page 15.			
		 Repair is complete. Generate Readiness Code. Refer to ⇒ "3.2 Readiness Code", page 9 			
		Return vehicle to Customer.			
		♦ If all electrical connections are OK:			
		♦ REPLACE: Data Bus On Board Diagnostic Interface - J533 Refer to appropriate repair manual.			
		 Repair is complete. Generate Readiness Code. Refer to ⇒ "3.2 Readiness Code", page 9 			
		♦ Return vehicle to Customer.			
	oss athnoised by Volkswagen AG. Volkswage	 NO: ◆ Perform the diagnostic procedure for any nAcDTC's. 			
	ed by Volkswe	♦ If no DTC's return the repair is complete.			
	authorise	♦ Return vehicle to customer.			
3.6.5 CAN-Bus Terminal Resistance, Power-train, Checking General Description The Former Control Medula 1623 communicates with all date.					
General Description					
The En	The Engine Control Module - J623- communicates with all databus capable control modules via a CAN databus.				
data b CAN_I	These databus capable control modules are connected via two data bus wires which are twisted together (CAN_High and CAN_Low), and exchange information (messages). Missing information on the databus is recognized as a malfunction and				
minal ı	e-free operation of the CAN-bus requires that it have resistance. The central terminal resistor is located to control Module - J623	ve a ter- in the			
Specia	al tools and workshop equipment required				
♦ Mu	Itimeter.	.uguro			
♦ Wir	ring Diagram.	outdoo'x			
Test re	equirements	Swo Wampy			
• Fus	 Multimeter. Wiring Diagram. Test requirements Fuses OK. Battery voltage OK. 				
• Bat	Battery voltage OK.				
	Switch OFF All electrical and electronic accessories.				
• Vel	hicles with Auto. Transmission, ensure Selector Le on is in "P".	ever po-			
160	Rep. Gr.ST - Generic Scan Tool				

3.6.5 CAN-Bus Terminal Resistance, Powertrain, Checking

General Description

Special tools and workshop equipment required Protected by copyright, Copyright

- Multimeter.
- Wiring Diagram.

- Fuses OK.
- Battery voltage OK.
- Switch OFF All electrical and electronic accessories.
- Vehicles with Auto. Transmission, ensure Selector Lever position is in "P".

- Vehicles with Manual Transmission, ensure Shifter Lever position is in "N" with Parking Brake applied.
- Observe all safety precautions: ⇒ "1.1 Safety Precautions", page 2.
- View clean working conditions: . ⇒ "1.2 Clean Working Conditions", page 4 .

Step	Procedure	Result / Action to Take
1	 PERFORM: Preliminary Check to verify the customers complaint. Refer to ⇒ "3.1 Preliminary Check", page 9 Was Complaint verified? 	 YES: GO TO: Step 2 ⇒ page 161 . NO: GATHER more information from customer about the complaint.
3	 SPECIFIED VALUE: 60 – 72 Ω (at approx. 20° C). Was Value obtained? REMOVE: Engine Control Module - J623 	 REPAIR: Faulty wiring or connector. GO TO: Step 4 ⇒ page 162. NO: GO TO: Step 3 ⇒ page 161.
	 Refer to appropriate repair manual. CHECK: CAN bus circuit between the DSG Transmission Mechatronic - J743- harness connector T20 / 15 and the Engine Control Module- J623- harness connector T94 / 67 for resistance. CHECK: CAN bus circuit between the DSG Transmission Mechatronic - J743- harness connector T20 / 10 and the Engine Control Module- J623- harness connector T94 / 68 for resistance. SPECIFIED VALUE: 0.5 Ω (± 0.3 Ω). Were Values obtained? 	PERFORM: Visual Inspection of wiring and component. CHECK: Wiring for open, high resistance, short or harness connector for damage, corro-
	ANDINGO MOINGO APPROPRIA	. DA negswealo V Volh Gingo Jinshi Yode

Step		Procedure		Result / Action to Take
4	•	Final Procedure Perform a road test to verify repair. Does the original DTC return?	-	YES: CHECK: DSG Transmission Mechatronic - J743- harness connector for any damaged, pushed-out pins.
			♦	REPAIR: As necessary.
			•	Clear the DTC's. Refer to ⇒ "3.3.4 Diagnostic Mode 04 - Erase DTC Memory", page 15.
			*	Repair is complete. Generate Readiness Code. Refer to ⇒ "3.2 Readiness Code", page 9.
			•	Return vehicle to Customer.
			•	If all electrical connections are OK:
			•	REPLACE: DSG Transmission Mechatronic - J743 Refer to appropriate repair manual.
			•	Repair is complete. Generate Readiness Code. Refer to ⇒ "3.2 Readiness Code", page 9.
			•	Return vehicle to Customer.
			-	NO: Perform the diagnostic procedure for any DTC's.
			•	If no DTC's return the repair is complete.
			♦	Return vehicle to customer.

Charge Air Pressure Sensor G31-, 3.6.6 Checking



Note

This test is for the Charge Air Pressure Sensor - G31-stand-alone sensor only. Refer to the Intake Manifold Sensor - GX9- test for the combination sensor.

General Description

-alone st for nectness of information in in his present in the correctness of information in in his present in the correctness of information The Charge Air Pressure Sensor - G31- is located in the inlet to the intake manifold. The Engine Control Module - J623- uses the sensor's signal to regulate the charge air pressure. There is no substitute function in the event of signal failure. Charge air pressure regulation is shut off, leading to a significant reduction in engine output.

Special tools and workshop equipment required

- Multimeter.
- Wiring Diagram.
- ♦ Scan Tool .

- Fuses OK.
- Battery voltage OK.



- Switch OFF All electrical and electronic accessories.
- Vehicles with Auto. Transmission, ensure Selector Lever position is in "P".
- Vehicles with Manual Transmission, ensure Shifter Lever position is in "N" with Parking Brake applied.
- Observe all safety precautions: ⇒ "1.1 Safety Precautions", page 2
- View clean working conditions: . ⇒ "1.2 Clean Working Conditions", page 4 .

Step	Procedure	Result / Action to Take
1	 PERFORM: Preliminary Check to verify the customers complaint. Refer to ⇒ "3.1 Preliminary Check", page 9 Was Complaint verified? 	 YES: GO TO: Step 2 ⇒ page 163. NO: GATHER more information from customer about the complaint.
2	 IGNITION: OFF. DISCONNECT: Charge Air Pressure Sensor - G31- harness connector. IGNITION: ON. CHECK: Charge Air Pressure Sensor - G31- harness connector terminals 1 to 3 for voltage. IGNITION: OFF. SPECIFIED VALUE: About 5.0 V. Was Value obtained? 	I– NO·
3	 REMOVE: Engine Control Module - J623 Refer to appropriate repair manual. CHECK: Charge Air Pressure Sensor - G31-harness connector terminal 4 to the Engine Control Module - J623- harness connector T60 / 39 for resistance. SPECIFIED VALUE: 0.5 Ω (± 0.3 Ω). Was Value obtained? 	 YES: REPLACE: Charge Air Pressure Sensor - G31 Refer to appropriate repair manual. GO TO: Step 5 ⇒ page 164. NO: PERFORM: Visual Inspection of wiring and component. CHECK: Wiring for open, high resistance, short or harness connector for damage, corrosion, loose or broken terminals. REPAIR: Faulty wiring or connectors GO TO: Step 5 ⇒ page 164.
4	 REMOVE: Engine Control Module - J623 Refer to appropriate repair manual. CHECK: Charge Air Pressure Sensor - G31-harness connector terminal 1 to the Engine Control Module - J623- harness connector T60 / 13 for resistance. CHECK: Charge Air Pressure Sensor - G31-harness connector terminal 3 to the Engine Control Module - J623- harness connector T60 / 27 for resistance. SPECIFIED VALUE: 0.5 Ω (± 0.3 Ω). Were Values obtained? 	 YES: GO TO: Step 5 ⇒ page 164. NO: PERFORM: Visual Inspection of wiring and component. CHECK: Wiring for open, high resistance, short or harness connector for damage, corrosion, loose or broken terminals. REPAIR: Faulty wiring or connector. GO TO: Step 5 ⇒ page 164.

Final Procedure Perform a road test to verify repair. Does the original DTC return? Final Procedure Perform a road test to verify repair. Does the original DTC return? Fig. CHECK: Engine Control Module - J ness connector for any damaged, ppins. REPAIR: As necessary. If all electrical connections are OK: REPLACE: Engine Control Module - J fall electrical connections are OK: REPLACE: Engine Control Module - J and proposed the refer to page 15. Repair is complete. Generate Read Code. Refer to page 15. Repair is complete. Generate Read Code. Refer to page 15. Perform the diagnostic procedure for DTC's. Perform the diagnostic procedure for DTC's. If no DTC's return the repair is come. Return vehicle to customer. 3.6.7 Coolant Circulation Pump Relay - J151- / After-Run Coolant Pump - V51-, Checking General Description The Engine Control Module - J623- closes the Coolant Circulation Pump Relay - J151- in order for it to provide the power supply voltage to the After-Run Coolant Pump - V51 The Engine Control Module - J623- cycles the relay (and the coolant pump) on and off as necessary. Special tools and workshop equipment required Multimeter. Wiring Diagram. Scan Tool. We have all safety precautions: Test requirements Fuses OK. Battery voltage OK. Switch OFF all electrical and electronic accessories. Vehicles with Man. Transmission, ensure Selector Lever position is in "P". Vehicles with Man. Transmission, ensure Shifter Lever position is in "P". Vehicles with Man. Transmission, ensure Shifter Lever position is in "N" with Parking Brake applied. Observe all safety precautions: 1 1 Safety Precautions: 1 2 1 Safety Precautions: 1 3 2 1 Safety Precautions: 1 3 2 1 Safety Precautions: 1 4 2 1 Safety Precautions: 1 5 2 1 Safety Precautions: 1 5 2 1 Safety Precautions: 1 6 2 1 Safety Precautions: 1 5 2 1 Safety Precautions: 1 5 2 1 Safety Precautions: 1 6 2 1 Safety Precautions: 1 7 2 1 Safety P	any damaged, pushed-ou eary. ections are OK: Control Module - J623				
 Does the original DTC return? REPAIR: As necessary. If all electrical connections are OK: REPLACE: Engine Control Module Refer to appropriate repair manual. Clear the DTC's. Refer to ⇒ "3.3.4 Diagnostic Mode 04 - Eras Memory", page 15. Repair is complete. Generate Read Code. Refer to ⇒ "3.2 Readiness Code", page 9. Return vehicle to Customer. NO: Perform the diagnostic procedure fo DTC's. If no DTC's return the repair is com Return vehicle to customer. 	ections are OK: Control Module - J623				
 If all electrical connections are OK: REPLACE: Engine Control Module Refer to appropriate repair manual. Clear the DTC's. Refer to ⇒ "3.3.4 Diagnostic Mode 04 - Eras Memory", page 15. Repair is complete. Generate Read Code. Refer to ⇒ "3.2 Readiness Code", page 9. Return vehicle to Customer. NO: Perform the diagnostic procedure for DTC's. If no DTC's return the repair is com Return vehicle to customer. 	ections are OK: Control Module - J623				
 REPLACE: Engine Control Module Refer to appropriate repair manual. Clear the DTC's. Refer to ⇒ "3.3.4 Diagnostic Mode 04 - Eras Memory", page 15. Repair is complete. Generate Read Code. Refer to ⇒ "3.2 Readiness Code", page 9. Return vehicle to Customer. NO: Perform the diagnostic procedure fo DTC's. If no DTC's return the repair is com Return vehicle to customer. 	Control Module - J623				
Refer to appropriate repair manual. ◆ Clear the DTC's. Refer to ⇒ "3.3.4 Diagnostic Mode 04 - Eras Memory", page 15. ◆ Repair is complete. Generate Read Code. Refer to ⇒ "3.2 Readiness Code", page 9. ◆ Return vehicle to Customer. - NO: ◆ Perform the diagnostic procedure fo DTC's. ◆ If no DTC's return the repair is com ◆ Return vehicle to customer.					
 ⇒ "3.3.4 Diagnostic Mode 04 - Eras Memory", page 15. ♦ Repair is complete. Generate Read Code. Refer to ⇒ "3.2 Readiness Code", page 9. ♦ Return vehicle to Customer. NO: ♦ Perform the diagnostic procedure fo DTC's. ♦ If no DTC's return the repair is com ♦ Return vehicle to customer. 					
Code. Refer to ⇒ "3.2 Readiness Code", page 9 Return vehicle to Customer. NO: Perform the diagnostic procedure for DTC's. If no DTC's return the repair is com Return vehicle to customer.					
 Return vehicle to Customer. NO: Perform the diagnostic procedure for DTC's. If no DTC's return the repair is com Return vehicle to customer. 					
 ◆ Perform the diagnostic procedure for DTC's. ◆ If no DTC's return the repair is com ◆ Return vehicle to customer. 					
• Return vehicle to customer.					
	ne repair is complete.				
3.6.7 Coolant Circulation Pump Relay - J151- / After-Run Coolant Pump - V51-, Checking General Description The Engine Control Module - J623- closes the Coolant Circulation Pump Relay - J151- in order for it to provide the power supply voltage to the After-Run Coolant Pump - V51-, The Engine Control Module - J623- cycles the relay (and the coolant pump) on and off as necessary.	stomer.				
trol Module - J623- cycles the relay (and the coolant pump) on and off as necessary. Special tools and workshop equipment required Multimeter.					
◆ Multimeter. A Wiring Diagram					
 ♦ Wiring Diagram. ♦ Scan Tool. 					
 Multimeter. Wiring Diagram. Scan Tool. Test requirements Fuses OK. 					
• Fuses OK.					
Battery voltage OK.					
Switch OFF all electrical and electronic accessories.					
• Vehicles with Auto. Transmission, ensure Selector Lever position is in "P".	Vehicles with Auto. Transmission ensure Selector Lever position is in "P".				
Vehicles with Man. Transmission, ensure Shifter Lever position is in "N" with Parking Brake applied.					
Observe all safety precautions: ⇒ "1.1 Safety Precautions", page 2 View clean working conditions: ⇒ "1.2 Clean Working Conditions", page 4 • View clean working Conditions Page 4 Page					
<u> ا ا ا ا ا ا ا ا ا ا ا ا ا ا ا ا ا ا ا</u>	Janua de la				

3.6.7 Coolant Circulation Pump Relay -J151- / After-Run Coolant Pump - V51-, Checking

General Description

Special tools and workshop equipment required

- Multimeter.
- Wiring Diagram.
- Scan Tool.

- Fuses OK.
- Battery voltage OK.
- Switch OFF all electrical and electronic accessories.
- Vehicles with Auto. Transmission, ensure Selector Lever position is in "P".
- Vehicles with Man. Transmission, ensure Shifter Lever position is in "N" with Parking Brake applied.
- Observe all safety precautions: ⇒ "1.1 Safety Precautions", page 2
- Protected by copyright, Copyring for, View clean working conditions: . ⇒ "1.2 Clean Working Conditions", page 4.





Step	,	Procedure		Result / Action to Take
1	SI SI SI	PERFORM: Preliminary Check to verify the customers complaint. Refer to ⇒ "3.1 Preliminary Check", page 9 . Was Complaint verified?	♦	YES: GO TO: Step 2 ⇒ page 165 . NO: GATHER more information from customer about the complaint.
3	A DELOS DUMOS	IGNITION: OFF. REMOVE: Coolant Circulation Pump Relay - J151 Refer to appropriate repair manual. IGNITION: ON. CHECK: Coolant Circulation Pump Relay - J151- socket terminals 1 (86) and 3 (30) to ground for voltage. IGNITION: OFF. SPECIFIED VALUE: Battery voltage Were Values obtained? CONNECT: Jumper wire, Coolant Circulation Pump Relay - J151- socket terminals 3 (30) and 5 (87). IGNITION: ON. IGNITION: OFF. SPECIFIED VALUE: After-Run Coolant Pump - V51- should be heard running. Was Value obtained? DISCONNECT: After-Run Coolant Pump - V51- harness connector.	* * * * * * * * * * * * * * * * * * *	YES: GO TO: Step 3 ⇒ page 165. NO: PERFORM: Visual inspection of wiring and component. CHECK: Wiring for open, high resistance, short or harness connector for damage, corrosion, loose or broken terminals. REPAIR: Faulty wiring or connector. GO TO: Step 7 ⇒ page 166. YES: GO TO: Step 6 ⇒ page 166. NO: GO TO: Step 4 ⇒ page 165. YES: GO TO: Step 5 ⇒ page 165.
	•	IGNITION: ON. CHECK: After-Run Coolant Pump - V51- harness connector terminal 1 to ground for voltage. SPECIFIED VALUE: Battery voltage. Was Value obtained?	* *	NO: PERFORM: Visual Inspection of wiring and component. CHECK: Wiring for open, high resistance, short or harness connector for damage, corrosion, loose or broken terminals. REPAIR: Faulty wiring or connector. GO TO: Step 7 ⇒ page 166.
5	•	CHECK: After-Run Coolant Pump - V51- harness connector terminal 2 to ground for resistance. SPECIFIED VALUE: 0.5 Ω (\pm 0.3 Ω). Was Value obtained?	* - *	YES: REPLACE: After-Run Coolant Pump - V51 Refer to appropriate repair manual. GO TO: Step 7 ⇒ page 166 . NO: PERFORM: Visual Inspection of wiring and component. CHECK: Wiring for open, high resistance, short or harness connector for damage, corrosion, loose or broken terminals. REPAIR: Faulty wiring or connector. GO TO: Step 7 ⇒ page 166 .

Step		Procedure		Result / Action to Take
6	•	REMOVE: Jumper wire, Coolant Circulation Pump Relay - J151- socket terminals 3 (30) and 5 (87).		YES: REPLACE: Coolant Circulation Pump Relay - J151 Refer to appropriate repair manual.
	•	REMOVE: Engine Control Module - J623 Refer to appropriate repair manual.	*	GO TO: Step 7 <u>⇒ page 166</u> .
	•	CHECK: Coolant Circulation Pump Relay - J151- socket terminal 2 (85) to the Engine Control Module - J623- harness connector	→	NO: PERFORM: Visual Inspection of wiring and component.
		T94 / 27 for resistance.	♦	CHECK: Wiring for open, high resistance, short or harness connector for damage, corro-
	•	SPECIFIED VALUE: $0.5 \Omega (\pm 0.3 \Omega)$.		sion, loose or broken terminals.
	-	Was Value obtained?		REPAIR: Faulty wiring or connector.
			•	GO TO: Step 7 <u>⇒ page 166</u> .
7	•	Final Procedure Perform a road test to verify repair. Does the original DTC return?	-	YES: CHECK: Engine Control Module - J623- har- ness connector for any damaged, pushed-out pins.
		Does the original DTO return:	*	REPAIR: As necessary.
			*	If all electrical connections are OK:
			•	REPLACE: Engine Control Module - J623 Refer to appropriate repair manual.
			•	Clear the DTC's. Refer to ⇒ "3.3.4 Diagnostic Mode 04 - Erase DTC Memory", page 15.
			•	Repair is complete. Generate Readiness Code. Refer to ⇒ "3.2 Readiness Code", page 9.
		10	♦	Return vehicle to Customer. ANO: AGO VOIkswagen AGO OPEN AGO OPE
		indisedby	•	Perform the diagnostic procedure for any DTC's.
		destall	•	If no DTC's return the repair is complete.
		mike dine se alihorise ed by Vol	•	Return vehicle to customer.

Engine Coolant Temperature Sensor -3.6.8 G62-, Checking

General Description

The Engine Coolant Temperature Sensor - G62- sends information about the current coolant temperature to the Engine Control Module - J623- . It uses the coolant temperature as a correction value for calculating the injection quantity.

Special tools and workshop equipment required

- Multimeter.
- Wiring Diagram.
- ♦ Scan Tool.

- Fuses OK.
- Battery voltage OK.



- Switch OFF All electrical and electronic accessories.
- Vehicles with Auto. Transmission, ensure Selector Lever position is in "P".
- Vehicles with Manual Transmission, ensure Shifter Lever position is in "N" with Parking Brake applied.
- Observe all safety precautions: ⇒ \$1.1 Safety Precautions", page 2.
- View clean working conditions: . ⇒ 1.2 Clean Working Conditions", page 4

Step	Procedure	Result / Action to Take
1	PERFORM: Preliminary Check to verify the customers complaint. Refer to ⇒ "3.1 Preliminary Check", page 9 Was Complaint verified?	 YES: GO TO: Step 2 page 167. NO: GATHER more information from customer about the complaint.
2	 IGNITION: OFF. DISCONNECT: Engine Coolant Temperature Sensor - G62- harness connector. CHECK: Engine Coolant Temperature Sensor - G62- component connector terminals 1 to 2 for resistance. SPECIFIED VALUE: 2,250 Ω (+/- 750 @ approx. 20° C). Was Value obtained? 	 YES: GO TO: Step 3 ⇒ page 167. NO: REPLACE: Engine Coolant Temperature Sensor - G62 Refer to appropriate repair manual. GO TO: Step 4 ⇒ page 168.
3	 REMOVE: Engine Control Module - J623 Refer to appropriate repair manual. CHECK: Engine Coolant Temperature Sensor - G62- harness connector terminal 1 to the Engine Control Module - J623- harness connector T60 / 57 for resistance. CHECK: Engine Coolant Temperature Sensor - G62- harness connector terminal 2 to the Engine Control Module - J623- harness connector T60 / 14 for resistance. SPECIFIED VALUE: 0.5 Ω (± 0.3 Ω). Were Values obtained? 	 PERFORM: Visual Inspection of wiring and component. CHECK: Wiring for open, high resistance,

Step	Procedure	Result / Action to Take
4	 Final Procedure Perform a road test to verify repair. Does the original DTC return? 	 YES: CHECK: Engine Control Module - J623- harness connector for any damaged, pushed-out pins.
	orin	♦ REPAIR: As necessary.
	part	♦ If all electrical connections are OK:
)oses, ir	♦ REPLACE: Engine Control Module - J623 Refer to appropriate repair manual.
	nercial purp	◆ Clear the DTC's. Refer to ⇒ "3.3.4 Diagnostic Mode 04 - Erase DTC Memory", page 15.
	Wate of com	 Repair is complete. Generate Readiness Code. Refer to ⇒ "3.2 Readiness Code", page 9
	the top of	♦ Return vehicle to Customer.
	ooppass, i	 NO: Perform the diagnostic procedure for any DTC's.
	Notected by	♦ If no DTC's return the repair is complete.
		♦ Return vehicle to customer.

3.6.9 Engine Coolant Temperature Sensor On Radiator Outlet - G83-

General Description

The Engine Coolant Temperature Sensor On Radiator Outlet - G83- sends information about the current coolant temperature to the Engine Control Module - J623- . It uses the coolant temperature as a correction value for calculating the injection quantity.

Special tools and workshop equipment required

- Multimeter.
- Wiring Diagram.
- ♦ Scan Tool.

- Fuses OK.
- Battery voltage OK.
- · Switch OFF All electrical and electronic accessories.
- Vehicles with Auto. Transmission, ensure Selector Lever position is in "P".
- Vehicles with Manual Transmission, ensure Shifter Lever position is in "N" with Parking Brake applied.
- Observe all safety precautions:
 ⇒ "1.1 Safety Precautions", page 2
- View clean working conditions: .
 ⇒ "1.2 Clean Working Conditions", page 4

	AG VOKSWAGON A	Generic Scan Tool - Edition 11.2014
Test P	rocedure Volkswagen AC. Volkswagen AG.	Generic Scan Tool - Edition 11.2014
Step	Procedure	Result / Action to Take
1	 PERFORM: Preliminary Check to verify the customers complaint. Refer to ⇒ "3 Preliminary Check", page 9 Was Complaint verified? 	 YES: GO TO: Step 2 ⇒ page 169 . NO: GATHER more information from customer about the complaint.
2		- YES:
2	 DISCONNECT: Engine Coolant Temperature Sensor On Radiator Outlet - G83- harness connector. CHECK: Engine Coolant Temperature Sensor On Radiator Outlet - G83- component connector terminals 1 to 2 for resistance. SPECIFIED VALUE: 2,250 Ω (+/- 750 Ω @ approx. 20° C). 	 GO TO: Step 3 ⇒ page 169 . NO: REPLACE: Engine Coolant Temperature Sensor On Radiator Outlet G83 Refer to appropriate repair manual. GO TO: Step 4 ⇒ page 169 .
	- Was Value obtained?	natio
3	REMOVE: Engine Control Module - J623 Refer to appropriate repair manual.	- YES: ◆ GO TO: Step 4 ≥ page 169 .
	 CHECK: Engine Coolant Temperature Sensor On Radiator Outlet - G83- harness connector terminal 1 to the Engine Control Module - J623- harness connector terminal T94 / 36 for resistance. CHECK: Engine Coolant Temperature Sensor On Radiator Outlet - G83- harness connector terminal 2 to the Engine Control Module - J623- harness connector terminal T94 / 12 for resistance. 	 ◆ PERFORM: Visual Inspection of wiring and component. ◆ CHECK: Wiring for open, high resistance.
		◆ REPAIR: Faulty wiring or connector.
	• SPECIFIED VALUE: 0.5 Ω (± 0.3 Ω).	
	– Were Values obtained?	
4	Final ProcedurePerform a road test to verify repair.Does the original DTC return?	 YES: CHECK: Engine Control Module - J623- harness connector for any damaged, pushed-out pins.
	_	♦ REPAIR: As necessary.
		♦ If all electrical connections are OK:
		REPLACE: Engine Control Module - J623 Refer to appropriate repair manual.
		◆ Clear the DTC's. Refer to ⇒ "3.3.4 Diagnostic Mode 04 - Erase DTC Memory", page 15.
		 Repair is complete. Generate Readiness Code. Refer to ⇒ "3.2 Readiness Code", page 9
		Return vehicle to Customer.
		NO:◆ Perform the diagnostic procedure for any DTC's.
		◆ If no DTC's return the repair is complete.
		Return vehicle to customer.

3.6.10 Engine Speed Sensor - G28-, Checking

General Description

The Engine Speed Sensor - G28- detects rpm and reference marks from a toothed wheel on the crankshaft. Without an engine speed signal, the engine will not start. If the engine speed signal fails while the engine is running, the engine will stop immediately.

Special tools and workshop equipment required

- Multimeter.
- Wiring Diagram.
- Scan Tool.

- Fuses OK.
- Battery voltage OK.
- Switch OFF All electrical and electronic accessories.
- Vehicles with Auto. Transmission, ensure Selector Lever position is in "P".
- Vehicles with Manual Transmission, ensure Shifter Lever position is in "N" with Parking Brake applied.
- Observe all safety precautions: ⇒ "1.1 Safety Precautions", page 2
- View clean working conditions: . ⇒ "1.2 Clean Working Conditions", page 4

Test Procedure		cedure	wewagen AG. Volkswagen AG does	
Step		Procedure	Result / Action to Take	
1	-	PERFORM: Preliminary Check to verify the customers complaint. Refer to ⇒ "3.1 Preliminary Check", page 9 Was Complaint verified?		
2	•	IGNITION: OFF. DISCONNECT: Engine Speed Sensor - G28-harness connector.	 YES: ◆ REMOVE: Engine Speed Sensor - G28 Refer to appropriate repair manual. 	
	•	REMOVE: Engine Control Module - J623 Refer to appropriate repair manual.	◆ CHECK: Engine Speed Sensor - G28- wheel for proper seating, damage and/or run - out. Refer to appropriate repair manual.	
	•	CHECK: Engine Speed Sensor - G28- harness connector terminal 1 to the Engine Control Module - J623- harness connector T60 / 51 for resistance.		
		CHECK: Engine Speed Sensor - G28- harness connector terminal 2 to the Engine Control Module - J623- harness connector T60 / 36 for resistance.	NO.	
	-	SPECIFIED VALUE: $0.5~\Omega~(\pm~0.3~\Omega)$. Were Values obtained?	CHECK: Wiring for open, high resistance, short or harness connector for damage, corresion, loose or broken terminals.	
			REPAIR: Faulty wiring or connector of the GO TO: Step 3 ⇒ page 174 connector.	

Step	Procedure	Result / Action to Take
3	 Final Procedure Perform a road test to verify repair. 	 YES: ◆ CHECK: Engine Control Module - J623- harness connector for any damaged, pushed-out pins.
	– Does the original DTC return?	◆ REPAIR: As necessary.
		◆ If all electrical connections are OK:
		◆ REPLACE: Engine Control Module - J623 Refer to appropriate repair manual.
		◆ Clear the DTC's. Refer to ⇒ "3.3.4 Diagnostic Mode 04 - Erase DTC Memory", page 15.
		 Repair is complete. Generate Readiness Code. Refer to ⇒ "3.2 Readiness Code", page 9
		Return vehicle to Customer.
		 NO: ◆ Perform the diagnostic procedure for any DTC's.
		♦ If no DTC's return the repair is complete.
		◆ Return vehicle to customer.
Engine Specia Mu Wii Sca Test re	Tal Description System is designed so that the admission of fuel of place only at idle and at light part-throttle. The EVAP Curge Regulator Valve 1 - N80- is map-activated by the Control Module - J623- to accomplish this task. Tal tools and workshop equipment required altimeter. Tring Diagram. Tan Tool. The equirements are of the control of the	S. Lever po- Lever po- Lever po-
• Sw	vitch OFF All electrical and electronic accessories.	S.
Vel siti	hicles with Auto. Transmission, ensure Selector Leon is in "P".	Lever po-
Ve siti	hicles with Manual Transmission, ensure Shifter Loon is in "N" with Parking Brake applied.	Lever po-
⇒ "	serve all safety precautions: 1.1 Safety Precautions", page 2 .	Tulburdo in
• Vie <u>⇒</u> "	ew clean working conditions: . "Only page 4 on a conditions", page 4 on a conditions", page 4 on a conditions of the con	- DA nagswaylo Vyor.

3.6.11

General Description

Special tools and workshop equipment required

- Multimeter.
- Wiring Diagram.
- Scan Tool.

- Fuses OK.
- Battery voltage OK.
- Switch OFF All electrical and electronic accessories.
- Vehicles with Auto. Transmission, ensure Selector Lever position is in "P".
- Vehicles with Manual Transmission, ensure Shifter Lever position is in "N" with Parking Brake applied.
- Observe all safety precautions: ⇒ "1.1 Safety Precautions", page 2
- View clean working conditions: . ⇒ "1.2 Clean Working Conditions", page 4 o. .



Step	Procedure	Result / Action to Take
1	 PERFORM: Preliminary Check to verify the customers complaint. Refer to ⇒ "3.1 Preliminary Check", page 9 Was Complaint verified? 	 YES: GO TO: Step 2 ⇒ page 172. NO: GATHER more information from customer about the complaint.
2	 CHECK: EVAP Canister Purge Regulator Valve 1 - N80- component connector terminals 1 to 2 for resistance. SPECIFIED VALUE: 10 – 35 Ω (@ approx. 20° C). Was Value obtained? 	◆ GO TO: Step 5 ⇒ page 1733.
3	 IGNITION: ON. CHECK: EVAP Canister Purge Regulator Valve 1 - N80- harness connector terminal 1 to ground for voltage. IGNITION: OFF. SPECIFIED VALUE: Battery voltage. Was Value obtained? 	 YES: GO TO: Step 4 ⇒ page 172. NO: PERFORM: Visual Inspection of wiring and component. CHECK: Wiring for open, high resistance, short or harness connector for damage, corrosion, loose or broken terminals. REPAIR: Faulty wiring or connector. GO TO: Step 5 ⇒ page 173.
4	 REMOVE: Engine Control Module - J623 Refer to appropriate repair manual. CHECK: EVAP Canister Purge Regulator Valve 1 - N80- harness connector terminal 2 to the Engine Control Module - J623- harness connector T60 / 35 for resistance. SPECIFIED VALUE: 0.5 Ω (± 0.3 Ω) Was Value obtained? 	 YES: GO TO: Step 5 ⇒ page 173 NO: PERFORM: Visual Inspection of wiring and component. CHECK: Wiring for open, high resistance, short or harness connector for damage, corrosion, loose or broken terminals. REPAIR: Faulty wiring or connector. GO TO: Step 5 ⇒ page 173.

Step	Procedure	Result / Action to Take
5	Final ProcedurePerform a road test to verify repair.Does the original DTC return?	 YES: ◆ CHECK: Engine Control Module - J623- harness connector for any damaged, pushed-out pins.
		♦ REPAIR: As necessary.
		◆ If all electrical connections are OK:
		♦ REPLACE: Engine Control Module - J623 Refer to appropriate repair manual.
	agen AG. Volkswagen AG.	◆ Clear the DTC's. Refer to ⇒ "3.3.4 Diagnostic Mode 04 - Erase DTC Memory", page 15.
	oon and the standards of the standards o	Repair is complete. Generate Readiness Code. Refer to 3.2 Readiness Code", page 9.
	Juness	◆ Return vehicle to Customer.
	900000000000000000000000000000000000000	 NO: ◆ Perform the diagnostic procedure for any DTC's.
.0		♦ If no DTC's return the repair is complete.
in whole		Return vehicle to customer.

3.6.12 Fuel Delivery Unit - GX1- / Fuel Pump Control Module - J538-, Checking

General Description

trol ssure er Fuel , where it rough senring valves. The Engine Control Module - J623- tells the Fuel Pump Control Module - J538- the demand needed for fuel volume and pressure and activates the Transfer Fuel Pump - G6-. The Transfer Fuel Pump - G6- transfers fuel to the rest of the fuel system, where it is monitored by the Engine Control Module - J623- through sensors, and controlled through regulators and/or metering valves.

Special tools and workshop equipment required

- Multimeter.
- Protected by copyright. Wiring Diagram.
- ♦ Scan Tool.

- Fuses OK.
- Battery voltage OK.
- Switch OFF All electrical and electronic accessories.
- Vehicles with Auto. Transmission, ensure Selector Lever position is in "P".
- Vehicles with Manual Transmission, ensure Shifter Lever position is in "N" with Parking Brake applied.
- Observe all safety precautions: ⇒ "1.1 Safety Precautions", page 2
- View clean working conditions: . ⇒ "1.2 Clean Working Conditions", page 4



Note

When the door is opened or the Ignition is turned to the ON position the fuel pump is activated for 2 seconds to build up the pressure in the fuel system.

Step		Procedure	1/0/	Result / Action to Take
1	•	PERFORM: Preliminary Check to verify the customers complaint. Refer to ⇒ "3.1 Preliminary Check", page 9 Was Complaint verified?	- ` - !	YES: GO TO: Step 2 ⇒ page 174 . NO: GATHER more information from customer about the complaint.
2	•	IGNITION: ON. LISTEN: Transfer Fuel Pump - G6- should be heard running for 2 s. IGNITION: OFF. SPECIFIED VALUE: Transfer Fuel Pump ON for 2 s. Was Value obtained?	 I a construction I a const	YES: Condition may be intermittent. PERFORM: Visual Inspection of wiring and component. CHECK: Wiring for open, high resistance, short or harness connector for damage, corrosion, loose or broken terminals. REPAIR: Faulty wiring or connector. GO TO: Step 6 ⇒ page 175. NO: GO TO: Step 3 ⇒ page 174.
3	•	DISCONNECT: Fuel Pump Control Module - J538 IGNITION: ON. CHECK: Fuel Pump Control Module - J538- harness connector terminal 6 to 1 and 3 for voltage. CHECK: Fuel Pump Control Module - J538- harness connector terminal 6 to battery voltage for voltage. IGNITION: OFF. SPECIFIED VALUE: Battery voltage.	↓↓(q)	YES: GO TO Step 4 ⇒ page 174. NO: PERFORM: Visual Inspection of wiring and component. CHECK: Wiring for open, high resistance, short or harness connector for damage, corrosion, loose or broken terminals. REPAIR: Faulty wiring or connector. GO TO: Step 6 ⇒ page 175.
4	•	Were Values obtained? RECONNECT: Fuel Pump Control Module - J538 DISCONNECT: Transfer Fuel Pump - G6 CRANK: Engine. CHECK: Transfer Fuel Pump - G6- harness connector terminals 1 to 5 for voltage while engine is cranking. IGNITION: OFF. SPECIFIED VALUE: 7 – 11 V. Was Value obtained?	146-	YES: REPLACE: Transfer Fuel Pump - G6- , Refer to appropriate repair manual. GO TO: Step 6 ⇒ page 175 . NO: GO TO: Step 5 ⇒ page 175 .

Step	Procedure	Result / Action to Take
5	 DISCONNECT: Fuel Pump Control Module - J538- harness connector. 	 YES: GO TO: Step 6 ⇒ page 175 .
	 CHECK: Transfer Fuel Pump - G6- harness connector terminal 1 to the Fuel Pump Control Module - J538- harness connector terminal RED for resistance. 	 NO: ◆ PERFORM: Visual Inspection of wiring and component.
	CHECK: Transfer Fuel Pump - G6- harness connector terminal 5 to the Fuel Pump Control Module - J538- harness connector terminal	♦ CHECK: Wiring for open, high resistance, short or harness connector for damage, corrosion, loose or broken terminals.
	BLACK for resistance.	♦ REPAIR: Faulty wiring or connector.
	• SPECIFIED VALUE: $0.5 \Omega (\pm 0.3 \Omega)$.	◆ GO TO: Step 7 <u>⇒ page 175</u> .
	– Were Values obtained?	
6	 REMOVE: Engine Control Module - J623 Refer to the appropriate repair manual. 	YES: REPLACE: Fuel Pump Control Module - J538- Refer to appropriate repair manual
	 CHECK: Fuel Pump Control Module - J538- harness connector terminal 2 to the Engine of Control Module - J623- harness connector terminal T94 / 30 for resistance. 	J538- Refer to appropriate repair manual. ↓ GO TO: Step 7 ⇒ page 175 → NO: ◆ PERFORM: Visual Inspection of wiring and
	 SPECIFIED VALUE: 0.5 Ω (± 0.3 Ω). 	component.
	- Was Value obtained?	◆ CHECK: Wiring for open, high resistance, short or harness connector for damage, corrosion, loose or broken terminals.
	$s_{\mathcal{U}}$	REPAIR: Faulty wiring or connector.
	™ho/e,	 REPAIR: Faulty wiring or connector. GO TO: Step 7 ⇒ page 175.
7	 Final Procedure Perform a road test to verify repair. Does the original DTC return? 	YES: CHECK: Engine Control Module - J623- har-penses connector for any damaged, pushed-out pins.
	urpo	♦ REPAIR: As necessary.
	ojal p	◆ If all electrical connections are OK:
	commercial P	REPLACE: Engine Control Module - J623- Refer to appropriate repair manual.
	to all the total and the total	◆ Clear the DTC's. Refer to ⇒ "3.3.4 Diagnostic Mode 04 - Erase DTC Memory", page 15.
	THOUNDO NA NO	Refer to appropriate repair manual. ◆ Clear the DTC's. Refer to ⇒ "3.3.4 Diagnostic Mode 04 - Erase DTC Memory", page 15 ◆ Repair is complete. Generate Readiness Code. Refer to ⇒ "3.2 Readiness Code", page 9 Return vehicle to Customer. - NO: ◆ Perform the diagnostic procedure for any DTC's. ◆ If no DTC's return the repair is complete.
	7 <i>0</i> 6	Return venicie to Sustomer.
		NO:◆ Perform the diagnostic procedure for any DTC's.
		♦ If no DTC's return the repair is complete.
		Return vehicle to customer.

3.6.13 Fuel Injectors, Checking

General Description

The Fuel Injectors are controlled by the Engine Control Module - J623- and are mounted normally in the cylinder head. The fuel

Special tools and workshop equipment required

- Multimeter.
- Wiring Diagram.
- Scan Tool.
- ◆ LED Test Lamp.

Test requirements

- Fuses OK.
- Battery voltage OK.
- Switch OFF All electrical and electronic accessories.
- Vehicles with Auto. Transmission, ensure Selector Lever position is in "P".
- Vehicles with Manual Transmission, ensure Shifter Lever position is in "N" with Parking Brake applied.
- Observe all safety precautions: ⇒ "1.1 Safety Precautions", page 2
- View clean working conditions: . ⇒ "1.2 Clean Working Conditions", page 4.

(V)	Jetta/Beetle 2011 > Generic Scan Tool - Edition 11.2014 Injectors spray high-pressure atomized fuel directly into the compustion chamber. Special tools and workshop equipment required Multimeter. Wiring Diagram. Scan Tool. LED Test Lamp. Fest requirements Fuses OK. Battery voltage OK. Switch OFF All electrical and electronic accessories. Vehicles with Auto. Transmission, ensure Selector Lever position is in "P". Vehicles with Manual Transmission, ensure Shifter Lever position is in "N" with Parking Brake applied. Observe all safety precautions: 3"1.1 Safety Precautions: 3"1.1 Safety Precautions: 3"1.2 Clean Working conditions: 3"1.2 Clean Working conditions: 3"1.2 Clean Working conditions: 4"1.2 PERFORM: Preliminary Check to verify the safety of the computation o							
injecto	Jetta/Beetle 2011 ➤ Generic Scan Tool - Edition 11.2014 Injectors spray high-pressure atomized fuel directly into the com-							
bustion	n cł	hamber. '		odby Volkswas				
•		ools and workshop equipment required	ali	Holige	90/-			
		neter.	iless		QCC BOX			
	_	g Diagram.			STATE .			
		Tool.			BIII			
		est Lamp.			With			
	•	lirements S			asper			
		o OK.			A			
		y voltage OK.			Je co			
		n OFF All electrical and electronic accessories.			rrect			
sitio	on i	es with Auto. Transmission, ensure Selector Legis in "P".	ver p	00-	ness of in			
sitic	on i	les with Manual Transmission, ensure Shifter Le is in "N" with Parking Brake applied.	ver p	00-	Mormatio,			
⇒" ′	<u>1.1</u>	ve all safety precautions: Safety Precautions", page 2.			ninthis			
• Viev <u>⇒ "</u> Test Pi	1.2	clean working conditions: . Clean Working Conditions", page 4.	· OUIAN		- juguno.			
	<u> </u>	Paradina	*U	1401. D 1414 - 15 - 15 - 15 - 15 - 15 - 15 - 15	90,7			
Step	-	Procedure PEDEODM: Preliminary Check to verify the		(ES: Page 176 Step 2 ⇒ page 176				
1	•	PERFORM: Preliminary Check to verify the customers complaint. Refer to ⇒ "3.1 Preliminary Check", page 9.	♦ G	YES: "Palogold page 176 ." "DY ua68 No. 1. TO Y ua68 No.				
	_	Was Complaint verified?	♦ G	GATHER more information from customer about the complaint.				
2	•	IGNITION: OFF.		/ES:				
	•	DISCONNECT: Suspect Fuel Injector harness connector.	- N	GO TO: Step 3 <u>⇒ page 176</u> . NO:				
	•	CHECK: Suspect Fuel Injector component		REPLACE: Suspect Fuel Injector (s). Refer to appropriate repair manual.				
		connector terminals 1 to 2 for resistance (refer to the wiring diagram for proper terminal loca-		REPAIR: Faulty wiring or connector.				
		tions).		GO TO: Step 4 ⇒ page 177 .				
	•	SPECIFIED VALUE: $0.5-15\Omega$ (@ approx. 20° C).	· 	50 . G. E.E.F				
لــِــا	_	Was Value obtained?						
3	•	REMOVE: Engine Control Module - J623 Refer to appropriate repair manual.	♦ F	/ES: REPLACE: Suspect Fuel Injector for a me- chanical condition. Refer to appropriate repair				
	•	CHECK: Suspect Fuel Injector harness connector terminal 1 to the Engine Control Module	n	nanual.				
				GO TO: Step 4 <u>⇒ page 177</u> .				
		terminal locations).		NO: PERFORM: Visual Inspection of wiring and				
	•	CHECK: Suspect Fuel Injector harness con-		component.				
		nector terminal 2 to the Engine Control Module - J623- harness connector T60 / xx for resistance (refer to the wiring diagram for proper terminal locations).	S	CHECK: Wiring for open, high resistance, short or harness connector for damage, corrosion, loose or broken terminals.				
		SPECIFIED VALUE: 0.5 Ω (± 0.3 Ω).	♦ F	REPAIR: Faulty wiring or connector.				
	_	Were Values obtained?	♦ (GO TO: Step 4 <u>⇒ page 177</u> .				
	- vvere values obtained?							

Step	Procedure	Result / Action to Take
4	 Final Procedure Perform a road test to verify repair. Does the original DTC return? 	 YES: ◆ CHECK: Engine Control Module - J623- harness connector for any damaged, pushed-out pins.
		♦ REPAIR: As necessary.
		◆ If all electrical connections are OK:
		REPLACE: Engine Control Module - J623 Refer to appropriate repair manual.
		◆ Clear the DTC's. Refer to ⇒ "3.3.4 Diagnostic Mode 04 - Erase DTC Memory", page 15.
		 Repair is complete. Generate Readiness Code. Refer to ⇒ "3.2 Readiness Code", page 9
		Return vehicle to Customer.
	A Q Valkova	 NO: ◆ Perform the diagnostic procedure for any DTC's.
	Nolkswagen AG. Volkswagen AG does not	◆ If no DTC's return the repair is complete.
	outhorised by Volkswagen AG. Volkswagen AG does not gu	Return vehicle to customer.

3.6.14 Fuel Pressure Regulator Valve - N276-, Checking

General Description

The Engine Control Module - J623- regulates the Fuel Pressure Regulator Valve - N276- directly at the High Pressure Fuel Pump to control the low pressure valve inside the High Pressure Fuel Pump.

Special tools and workshop equipment required

- Multimeter.
- ◆ Wiring Diagram.
- ♦ Scan Tool.

- Fuses OK.
- Battery voltage OK.
- Switch OFF All electrical and electronic accessories.
- Vehicles with Auto. Transmission, ensure Selector Lever position is in "P".
- sition is in "P".
 Vehicles with Manual Transmission, ensure Shifter Lever position is in "N" with Parking Brake applied.
- Observe all safety precautions:
 ⇒ "1.1 Safety Precautions", page 2.
- View clean working conditions: .
 ⇒ "1.2 Clean Working Conditions", page 4

PERFORM: Preliminary Check to verify the customers complaint. Refer to ⇒ 3.1 Preliminary Check page 9. - Was Complaint verified? - Was Valve Pressure Regulator Valve - N276- harness connector terminals 1 to 2 for resistance. - SPECIFIED VALUE: 1.5 – 11 Ω (@ approx. 20° C). - Was Value obtained? - YES. - GO TO: Step 3 ⇒ page 178. - NO. - REPLACE: Fuel Pressure Regulator Valve - N276- harness connector terminal 1 to ground for voltage. - Was Value obtained? - YES. - GO TO: Step 3 ⇒ page 178. - NO. - REPLACE: Fuel Pressure Regulator Valve - N276- harness connector terminal 1 to ground for voltage. - YES. - GO TO: Step 5 ⇒ page 179. - YES. - O'C Step 5 ⇒ page 178. - NO. - PERFORM: Visual Inspection of wiring and component. - CHECK: Wiring for open, high resistance, short or harness connector for damage, corrosion, loose or broken terminals. - CHECK: Wiring for open, high resistance. - SPECIFIED VALUE: 0.5 Ω (± 0.3 Ω). - VES. - O'C Step 5 ⇒ page 179. - YES. - O'C Step 5 ⇒ page 179. - YES. - O'C Step 5 ⇒ page 179. - YES. - O'C Step 5 ⇒ page 179. - YES. - O'C Step 5 ⇒ page 179. - YES. - O'C Step 5 ⇒ page 179. - YES. - O'C Step 5 ⇒ page 179. - YES. - O'C Step 5 ⇒ page 179. - YES. - O'C Step 5 ⇒ page 179. - YES. - O'C Step 5 ⇒ page 179. - YES. - O'C Step 5 ⇒ page 179. - YES. - O'C Step 5 ⇒ page 179. - YES. - O'C Step 5 ⇒ page 179. - YES. - O'C Step 5 ⇒ page 179. - YES. - O'C Step 5 ⇒ page 179. - YES. - O'C Step 5 ⇒ page 179. - O'C Step 5 ⇒ page 178. - O'C Step 5 ⇒ page	 PERFORM: Preliminary Check to verify the customers complaint. Refer to ⇒ "3.1 Preliminary Check", page 9. Was Complaint verified? GO TO: Step 2 ⇒ page 178. NO: GATHER more information from customer about the complaint. IGNITION: OFF. DISCONNECT: Fuel Pressure Regulator Valve - N276- harness connector terminals 1 to 2 for resistance. SPECIFIED VALUE: 1.5 – 11 Ω (@ approx. 20° C). Was Value obtained? IGNITION: ON. CHECK: Fuel Pressure Regulator Valve - N276- harness connector terminal 1 to ground for voltage. IGNITION: OFF. SPECIFIED VALUE: Battery voltage. IGNITION: OFF. SPECIFIED VALUE: Battery voltage. Was Value obtained? REPAIR: Faulty wiring or connector. CHECK: Fuel Pressure Regulator Valve - N276- harness connector terminal 2 to the Engine Control Module - J623- harness connector 160 / 19 for resistance. SPECIFIED VALUE: 0.5 Ω (± 0.3 Ω) Was Value obtained? REPAIR: Faulty wiring or open, high resistance, short or harness connector of wiring and component. PERFORM: Visual Inspection of wiring and component. PES: GO TO: Step 5 ⇒ page 179. YES: GO TO: Step 5 ⇒ page 17
 customers complaint. Refer to ⇒ "3.1 Preliminary Check", page 9. Was Complaint verified? IGNITION: OFF. DISCONNECT: Fuel Pressure Regulator Valve - N276- harness connector. CHECK: Fuel Pressure Regulator Valve - N276- component connector terminals 1 to 2 for resistance. SPECIFIED VALUE: 1.5 – 11 Ω (@ approx. 20° C). Was Value obtained? IGNITION: ON. CHECK: Fuel Pressure Regulator Valve - N276- harness connector terminal 1 to ground for voltage. IGNITION: OFF. SPECIFIED VALUE: Battery voltage. Was Value obtained? REMOVE: Engine Control Module - J623- Refer to appropriate repair manual. CHECK: Fuel Pressure Regulator Valve - N276- harness connector terminal 2 to the Engine Control Module - J623- Arefer to appropriate repair manual. CHECK: Fuel Pressure Regulator Valve - N276- harness connector terminal 2 to the Engine Control Module - J623- harness connector T60 / 19 for resistance. REMOVE: Engine Control Module - J623- Refer to appropriate repair manual. CHECK: Fuel Pressure Regulator Valve - N276- harness connector terminal 2 to the Engine Control Module - J623- harness connector terminal 2 to the Engine Control Module - J623- harness connector terminal 2 to the Engine Control Module - J623- harness connector terminal 2 to the Engine Control Module - J623- harness connector terminal 2 to the Engine Control Module - J623- harness connector terminal 2 to the Engine Control Module - J623- harness connector terminal 2 to the Engine Control Module - J623- harness connector terminal 2 to the Engine Control Module - J623- harness connector to the Engine Control Module - J623- harness connector to the Engine Control tof	 customers complaint. Refer to = "3.1 Preliminary Check", page 9. Was Complaint verified? IGNITION: OFF. DISCONNECT: Fuel Pressure Regulator Valve - N276- harness connector. CHECK: Fuel Pressure Regulator Valve - N276- component connector terminals 1 to 2 for resistance. SPECIFIED VALUE: 1.5 – 11 Ω (@ approx. 20° C). Was Value obtained? IGNITION: OFF. GO TO: Step 2 ⇒ page 178. NO:
 Was Complaint verified? IGNITION: OFF. DISCONNECT: Fuel Pressure Regulator Valve - N276- harness connector terminals 1 to 2 for resistance. SPECIFIED VALUE: 1.5 – 11 Ω (@ approx. 20° C). Was Value obtained? IGNITION: OFF. SPECIFIED VALUE: Battery voltage. Was Value obtained? REMOVE: Engine Control Module - J623-Refer to appropriate repair manual. CHECK: Fuel Pressure Regulator Valve - N276- harness connector terminal 1 to ground for voltage. Was Value obtained? REMOVE: Engine Control Module - J623-Refer to appropriate repair manual. CHECK: Fuel Pressure Regulator Valve - N276- harness connector terminal 2 to the Engine Control Module - J623- harness connector Terminal 2 to the Engine Control Module - J623- harness connector Terminal 2 to the Engine Control Module - J623- harness connector Terminal 2 to the Engine Control Module - J623- harness connector Terminal 2 to the Engine Control Module - J623- harness connector Terminal 2 to the Engine Control Module - J623- harness connector Terminal 2 to the Engine Control Module - J623- harness connector Terminal 2 to the Engine Control Module - J623- harness connector Terminal 2 to the Engine Control Module - J623- harness connector Terminal 2 to the Engine Control Module - J623- harness connector Terminal 2 to the Engine Control Module - J623- harness connector Terminal 2 to the Engine Control Module - J623- harness connector Terminal 2 to the Engine Control Module - J623- harness connector Terminal 2 to the Engine Control Module - J623- harness connector Terminal 2 to the Engine Control Module - J623- harness connector Terminal 2 to the Engine Control Module - J623- harness connector Terminal 2 to the Engine Control Module - J623- harness connector Terminal 2 to the Engine Control Module - J623- harness connector Terminal 2 to the Engine Control Module - J623- harness connector Terminal 2 to the E	 Was Complaint verified? IGNITION: OFF. DISCONNECT: Fuel Pressure Regulator Valve - N276 - harness connector. CHECK: Fuel Pressure Regulator Valve - N276 - component connector terminals 1 to 2 for resistance. SPECIFIED VALUE: 1.5 – 11 Ω (@ approx. 20° C). Was Value obtained? IGNITION: ON. CHECK: Fuel Pressure Regulator Valve - N276 - harness connector terminal 1 to ground for voltage. IGNITION: OFF. SPECIFIED VALUE: Battery voltage. Was Value obtained? REMOVE: Engine Control Module - J623 - Refer to appropriate repair manual. CHECK: Fuel Pressure Regulator Valve - N276 - harness connector terminal 2 to the Engine Control Module - J623 - Refer to appropriate repair manual. CHECK: Fuel Pressure Regulator Valve - N276 - harness connector terminal 2 to the Engine Control Module - J623 - Refer to appropriate repair manual. CHECK: Fuel Pressure Regulator Valve - N276 - harness connector terminal 2 to the Engine Control Module - J623 - Refer to appropriate repair manual. CHECK: Fuel Pressure Regulator Valve - N276 - harness connector terminal 2 to the Engine Control Module - J623 - Refer to appropriate repair manual. CHECK: Fuel Pressure Regulator Valve - N276 - harness connector for demage, corrosion, loose or broken terminals. CHECK: Wiring for open, high resistance, short or harness connector for damage, corrosion, loose or broken terminals. CHECK: Wiring for open, high resistance, short or harness connector for damage, corrosion, loose or broken terminals. CHECK: Wiring for open, high resistance, short or harness connector for damage, corrosion, loose or broken terminals. REPAIR: Faulty wiring or connector.
 DISCONNECT: Fuel Pressure Regulator Valve - N276- harness connector. CHECK: Fuel Pressure Regulator Valve - N276- component connector terminals 1 to 2 for resistance. SPECIFIED VALUE: 1.5 – 11 Ω (@ approx. 20° C). Was Value obtained? IGNITION: ON. CHECK: Fuel Pressure Regulator Valve - N276- harness connector terminal 1 to ground for voltage. IGNITION: OFF. SPECIFIED VALUE: Battery voltage. Was Value obtained? CHECK: Wiring for open, high resistance, short or harness connector for damage, corrosion, loose or broken terminals. REPAIR: Faulty wiring or connector. CHECK: Fuel Pressure Regulator Valve - N276- harness connector terminal 2 to the Engine Control Module - J623- Refer to appropriate repair manual. CHECK: Wiring for open, high resistance, short or harness connector. GO TO: Step 4 ⇒ page 178. NO: PERFORM: Visual Inspection of wiring and component. REPAIR: Faulty wiring or connector. GO TO: Step 5 ⇒ page 179. NO: PERFORM: Visual Inspection of wiring and component. CHECK: Wiring for open, high resistance, short or harness connector of wiring and component. CHECK: Wiring for open, high resistance, short or harness connector for damage, corrosion, loose or broken terminals. CHECK: Wiring for open, high resistance, short or harness connector for damage, corrosion, loose or broken terminals. REPAIR: Faulty wiring or connector. CHECK: Wiring for open, high resistance, short or harness connector for damage, corrosion, loose or broken terminals. 	 DISCONNECT: Fuel Pressure Regulator Valve - N276- harness connector. CHECK: Fuel Pressure Regulator Valve - N276- component connector terminals 1 to 2 for resistance. SPECIFIED VALUE: 1.5 – 11 Ω (@ approx. 20° C). Was Value obtained? IGNITION: ON. CHECK: Fuel Pressure Regulator Valve - N276- harness connector terminal 1 to ground for voltage. IGNITION: OFF. SPECIFIED VALUE: Battery voltage. Was Value obtained? CHECK: Wiring for open, high resistance, short or harness connector for damage, corrosion, loose or broken terminals. REPAIR: Faulty wiring or connector. GO TO: Step 3 ⇒ page 178. NO: YES: GO TO: Step 4 ⇒ page 178. NO: PERFORM: Visual Inspection of wiring and component. CHECK: Wiring for open, high resistance, short or harness connector. GO TO: Step 5 ⇒ page 179. YES: GO TO: Step 5 ⇒ page 179. YES: GO TO: Step 5 ⇒ page 179. VES: GO TO: Step 5 ⇒ page 179. NO: PERFORM: Visual Inspection of wiring and component. CHECK: Wiring for open, high resistance, short or harness connector for damage, corrosion, loose or broken terminals. CHECK: Wiring for open, high resistance, short or harness connector for damage, corrosion, loose or broken terminals. REPAIR: Faulty wiring or connector.
 REMOVE: Engine Control Module - J623 Refer to appropriate repair manual. CHECK: Fuel Pressure Regulator Valve - N276- harness connector terminal 2 to the Engine Control Module - J623- harness connector. T60 / 19 for resistance. SPECIFIED VALUE: 0.5 Ω (± 0.3 Ω). Was Value obtained? REPAIR: Faulty wiring or connector. GO TO: Step 5 ⇒ page 179. NO: No To Step 10 ⇒ page 179. NO: No To Step 10 ⇒ page 179. CHECK: Wiring for open, high resistance, short or harness connector for damage, corrosion, loose or broken terminals. REPAIR: Faulty wiring or connector. 	 REMOVE: Engine Control Module - J623 Refer to appropriate repair manual. CHECK: Fuel Pressure Regulator Valve - N276- harness connector terminal 2 to the Engine Control Module - J623- harness connector. T60 / 19 for resistance. SPECIFIED VALUE: 0.5 Ω (± 0.3 Ω). Was Value obtained? REPAIR: Faulty wiring or connector. YES: GO TO: Step 5 ⇒ page 179 . NO: Nagen AG. Volkswagen AG. Vo
 Refer to appropriate repair manual. CHECK: Fuel Pressure Regulator Valve - N276- harness connector terminal 2 to the Engine Control Module - J623- harness connector T60 / 19 for resistance. SPECIFIED VALUE: 0.5 Ω (± 0.3 Ω). Was Value obtained? GO TO: Step 5 ⇒ page 179 . NO: Nagen AG. Volkswagen AG (n) of wiring and component. CHECK: Wiring for open, high resistance, short or harness connector for damage, corrosion, loose or broken terminals. REPAIR: Faulty wiring or connector. 	 Refer to appropriate repair manual. CHECK: Fuel Pressure Regulator Valve - N276- harness connector terminal 2 to the Engine Control Module - J623- harness connectors T60 / 19 for resistance. SPECIFIED VALUE: 0.5 Ω (± 0.3 Ω). Was Value obtained? GO TO: Step 5 ⇒ page 179 . NO: Nagen AG. Volkswagen AG. On the PERFORM: Visual Inspection of wiring and component. CHECK: Wiring for open, high resistance short or harness connector for damage, corrosion, loose or broken terminals. REPAIR: Faulty wiring or connector.
Rep. Gr.ST - Generic Scan Tool	
Rep. Gr.ST - Generic Scan Tool	Sophinal Part or in what is a purposes, in part or in what is a part of
	Rep. Gr.ST - Generic Scan Tool

Step	Procedure	Result / Action to Take
5	Final ProcedurePerform a road test to verify repair.Does the original DTC return?	 YES: ◆ CHECK: Engine Control Module - J623- harness connector for any damaged, pushed-out pins.
		♦ REPAIR: As necessary.
		◆ If all electrical connections are OK:
		♦ REPLACE: Engine Control Module - J623 Refer to appropriate repair manual.
		◆ Clear the DTC's. Refer to ⇒ "3.3.4 Diagnostic Mode 04 - Erase DTC Memory", page 15.
		 Repair is complete. Generate Readiness Code. Refer to ⇒ "3.2 Readiness Code", page 9
		◆ Return vehicle to Customer.
		 NO: ◆ Perform the diagnostic procedure for any DTC's.
		◆ If no DTC's return the repair is complete.
		Return vehicle to customer.

Fuel Pressure Sensor - G247 To the Checking cription 3.6.15

General Description

er po
The The Fuel Pressure Sensor G247- measures the fuel pressure in the high-pressure fuel system. The Engine Control Module - J623analyzes the signal and regulates the fuel high pressure through the Fuel Pressure Regulator Valve - N276- in the high-pressure pump.

Special tools and workshop equipment required

- ♦ Multimeter. §
- Wiring Diagram.

- Fuses OK.
- Battery voltage OK.
- Switch OFF All electrical and electronic accessories.
- Vehicles with Auto. Transmission, ensure Selector Lever position is in "P".
- Vehicles with Manual Transmission, ensure Shifter Lever position is in "N" with Parking Brake applied.
- Observe all safety precautions: ⇒ "1.1 Safety Precautions", page 2
- View clean working conditions: . ⇒ "1.2 Clean Working Conditions", page 4





Ct-2	Procedure			Decult / Action to Tales
Step				Result / Action to Take
si sanga si	-	PERFORM: Preliminary Check to verify the customers complaint. Refer to ⇒ "3.1 Preliminary Check", page 9. Was Complaint verified?	- +	YES: GO TO: Step 2 ⇒ page 180 . NO: GATHER more information from customer about the complaint.
2	•	IGNITION: OFF.	7	YES:
		DISCONNECT: Fuel Pressure Sensor - G247-harness connector.	♦	GO TO: Step 3 <u>⇒ page 180</u> . NO: GO TO: Step 4 <u>⇒ page 180</u> .
Clar	•	IGNITION: ON.	•	GO TO. Step 4 <u>⇒ page Too</u> .
vate of commercia	•	CHECK: Fuel Pressure Sensor - G247- harness connector terminals 1 to 3 for voltage.		nationin
O'RIN	•	IGNITION: OFF.		The second secon
	90/c	SPECIFIED VALUE: About 5.0 V. Was Value obtained? REMOVE: Engine Control Module - J623		illalifo
3	•	REMOVE: Engine Control Module - J623 Refer to appropriate repair manual.	O-in	YES: REPLACE: Fuel Pressure Sensor - G247
	•	CHECK: Fuel Pressure Sensor G247- harness connector terminal 2 to the Engine Control Module - J623- harness connector T60 / 40	*	Refer to appropriate repair manual. GO TO: Step 5 <u>⇒ page 181</u> .
		for resistance. SPECIFIED VALUE: $0.5 \Omega \ (\pm \ 0.3 \ \Omega)$.	*	NO: PERFORM: Visual Inspection of wiring and component.
	_	Was Value obtained?	•	CHECK: Wiring for open, high resistance, short or harness connector for damage, corrosion, loose or broken terminals.
			♦	REPAIR: Faulty wiring or connector.
			♦	GO TO: Step 5 <u>⇒ page 181</u> .
4	•	REMOVE: Engine Control Module - J623 Refer to appropriate repair manual.	-	YES: GO TO: Step 5 ⇒ page 181 .
	•	CHECK: Fuel Pressure Sensor - G247- harness connector terminal 1 to the Engine Control Module - J623- harness connector T60 / 13 for resistance.	-	NO: PERFORM: Visual Inspection of wiring and component.
		CHECK: Fuel Pressure Sensor - G247- harness connector terminal 3 to the Engine Con-	•	CHECK: Wiring for open, high resistance, short or harness connector for damage, corrosion, loose or broken terminals.
		trol Module - J623- harness connector T60 / 29 for resistance.	♦	REPAIR: Faulty wiring or connector.
		SPECIFIED VALUE: 0.5 Ω (± 0.3 Ω).	♦	GO TO: Step 5 <u>⇒ page 181</u> .
	-	Were Values obtained?		

Step	Procedure	Result / Action to Take
5	Final Procedure AG. Volkswagen AG does not gual a road test to verify repair. Perform a road test to verify repair. Ooes the original DTC return?	 YES: ◆ CHECK: Engine Control Module - J623- harness connector for any damaged, pushed-out pins.
8		REPAIR: As necessary.
,xedun.		◆ If all electrical connections are OK:
Potorini		◆ REPLACE: Engine Control Module - J623 Refer to appropriate repair manual.
18/18/1		◆ Clear the DTC's. Refer to ⇒ "3.3.4 Diagnostic Mode 04 - Erase DTC Memory", page 15.
or commercial department of the second of th		◆ Repair is complete. Generate Readiness Code. Refer to ⇒ "3.2 Readiness Code", page 9.
		Return vehicle to Customer.
		- NO: ♣ Perform the diagnostic procedure for any DTC's.
rmos		♦ If no DTC's return the repair is complete.
Nateon		Return vehicle to customer.

3.6.16 Ignition Coils With Power Output Stage, Checking Volkswagen AG.

General Description

The ignition coil must transform the relatively low 12 V on-board vehicle voltage to the high ignition voltage required and supply the energy stored in that voltage to the spark plug. The functional principle of the ignition coil is relatively simple. It has a primary winding (small number of turns) and a secondary winding (lots of turns). The turn ratio between the number of primary and secondary winding turns determines the level of the voltage generated at the output. The Ignition Coils With Power Output Stage are plugged directly into the spark plug. This means the ignition energy can be transferred directly to the spark plug with virtually zero power loss.

Special tools and workshop equipment required

- Multimeter.
- Wiring Diagram.
- Scan Tool.
- ◆ LED Test Lamp.

- Fuses OK.
- Battery voltage OK.
- Switch OFF All electrical and electronic accessories.
- Vehicles with Auto. Transmission, ensure Selector Lever position is in "P".
- Vehicles with Manual Transmission, ensure Shifter Lever position is in "N" with Parking Brake applied.

- Observe all safety precautions: ⇒ "1.1 Safety Precautions", page 2.
- View clean working conditions: .

 ⇒ "1.2 Clean Working Conditions", page 4 .

Step	Procedure	Result / Action to Take
1	 PERFORM: Preliminary Check to verify the customers complaint. Refer to ⇒ "3.1 Preliminary Check", page 9 Was Complaint verified? 	 YES: GO TO: Step 2 ⇒ page 182. NO: GATHER more information from customer about the complaint.
2	 IGNITION: OFF. DISCONNECT: Suspect Ignition Coil With Power Output Stage harness connector. IGNITION: ON. CHECK: Suspect Ignition Coil With Power Output Stage harness connector terminals 1 to 2 and 4 for voltage. IGNITION: OFF. 	$g_{U_{2}}$
	SPECIFIED VALUE: Battery voltage. - Were Values obtained?	◆ GO TO: Step 5 ⇒ page 183 .
3	 REMOVE: Engine Control Module - J623 Refer to appropriate repair manual. CHECK: Suspect Ignition Coil With Power Output Stage harness connector terminal 3 to the Engine Control Module - J623- harness connector T60 / xx for resistance (refer to appropriate wiring diagram for proper terminal locations). SPECIFIED VALUE: 0.5 Ω (± 0.3 Ω). Was Value obtained? 	 ◆ PERFORM: Visual Inspection of wiring and component. ◆ CHECK: Wiring for open, high resistance, short or harness connector for damage, corrosion, loose or broken terminals. ◆ REPAIR: Faulty wiring or connector. ◆ GO TO: Step 5 ⇒ page 183.
4	 DISCONNECT: All of the Fuel Injectors . Refer to appropriate wiring diagram. DISCONNECT: Cold Start Injector (If applicable). CONNECT: Engine Control Module - J623-harness connector. CONNECT: LED Test Lamp to Suspect Ignition Coil With Power Output Stage harness connector terminals 1 to 3. CRANK: Engine. SPECIFIED VALUE: LED Test Lamp should Flicker ON & OFF. Was Value obtained? 	 YES: REPLACE: Suspect Ignition Coil With Power Output Stage . Refer to appropriate repair manual. GO TO: Step 5 ⇒ page 183 . NO: GO TO: Step 5 ⇒ page 183 .

Step		Procedure	Result / Action to Take
5	•	Final Procedure	 YES: CHECK: Engine Control Module - J623- harness connector for any damaged, pushed-out pins. REPAIR: As necessary. If all electrical connections are OK: REPLACE: Engine Control Module - J623 Refer to appropriate repair manual. Clear the DTC's. Refer to ⇒ "3.3.4 Diagnostic Mode 04 - Erase DTC Memory", page 15
		Does the original DTC return? Note: The control of	 Repair is complete. Generate Readiness Code. Refer to ⇒ "3.2 Readiness Code", page 9 Return vehicle to Customer. NO: Perform the diagnostic procedure for any DTC's. If no DTC's return the repair is complete. Return vehicle to customer.
	Nc	Intake Air Temperature Sensor - C Checking	-DA nagswaylo Vydyngingo

Intake Air Temperature Sensor - G42-3.6.17 Protected by copyright, Checking



This test is for the Intake Air Temperature Sensor - G42- standalone sensor only. Refer to the Intake Manifold Sensor - GX9- test for the combination sensor.

General Description

The Engine Control Module - J623- uses the Intake Air Temperature Sensor - G42- signal to calculate a correction value for the charge air pressure. Evaluation of the signal gives consideration to the influence of temperature on the density of the charge air.

Special tools and workshop equipment required

- Multimeter.
- Wiring Diagram.
- ♦ Scan Tool.

- Fuses OK.
- Battery voltage OK.
- Switch OFF All electrical and electronic accessories.
- Vehicles with Auto. Transmission, ensure Selector Lever position is in "P".
- Vehicles with Manual Transmission, ensure Shifter Lever position is in "N" with Parking Brake applied.

- Observe all safety precautions:
- Observe all safety precautions:

 ⇒ "1.1 Safety Precautions", page 2

 View clean working conditions:

 ⇒ "1.2 Clean Working Conditions", page 1

 est Procedure

Step	Procedure	Result / Action to Take 2	
1	 PERFORM: Preliminary Check to verify the customers complaint Refer to ⇒ "3.1 Preliminary Check", page 9 Was Complaint verified? 	 YES: GO TO: Step 2 ⇒ page 184 . NO: GATHER more information from customer about the complaint. 	
2	 IGNITION: OFF. DISCONNECT: Intake Air Temperature Sensor - G42- harness connector. CHECK: Intake Air Temperature Sensor - G42-component connector terminals 1 to 2 for resistance. SPECIFIED VALUE: 1,800 Ω (+/- 750 Ω @ approx. 20° C). Was Value obtained? 	 YES: GO TO: Step 3 ⇒ page 184 . NO: REPLACE: Intake Air Temperature Sensor - G42 Refer to appropriate repair manual. GO TO: Step 4 ⇒ page 185 . 	
3	 REMOVE: Engine Control Module - J623 Refer to appropriate repair manual. CHECK: Intake Air Temperature Sensor - G42-harness connector terminal 1 to the Engine Control Module - J623- harness connector T60 / 42 for resistance. CHECK: Intake Air Temperature Sensor - G42-harness connector terminal 2 to the Engine Control Module - J623- harness connector T60 / 14 for resistance. SPECIFIED VALUE: 0.5 Ω (± 0.3 Ω). Were Values obtained? 	 YES: GO TO: Step 4 ⇒ page 185 NO: PERFORM: Visual Inspection of wiring and 	

Step	Procedure	Result / Action to Take
4	 Final Procedure Perform a road test to verify repair. Does the original DTC return? 	 YES: CHECK: Engine Control Module - J623- harness connector for any damaged, pushed-out pins.
	_ coo are original _ r c retains	♦ REPAIR: As necessary.
		◆ If all electrical connections are OK:
		◆ REPLACE: Engine Control Module - J623 Refer to appropriate repair manual.
		◆ Clear the DTC's. Refer to ⇒ "3.3.4 Diagnostic Mode 04 - Erase DTC Memory", page 15.
		 Repair is complete. Generate Readiness Code. Refer to ⇒ "3.2 Readiness Code", page 9
		◆ Return vehicle to Customer.
	ase authorised by Volkswagen AG. Volkswagen AG.	 NO: ◆ Perform the diagnostic procedure for any DTC's.
	is 80 by Noine	♦ If no DTC's return the repair is complete.
	as authorit	♦ Return vehicle to customer.

Intake Manifold Runner Control Valve -3.6.18 N316-, Checking

General Description

and Habitity with respect to the correctness of information in the correct The intake manifold runner valve(s) are mounted on a common shaft and actuated by a vacuum cell. The partial vacuum required for actuation is supplied by the Intake Manifold Runner Control Valve - N316- . The Engine Control Module - J623- activates the Intake Manifold Runner Control Valve - N316- on the basis of a characteristic map.

Special tools and workshop equipment required

- Multimeter.
- Wiring Diagram.
- ♦ Scan Tool.

- Fuses OK.
- Battery voltage OK.
- Switch OFF All electrical and electronic accessories
- Vehicles with Auto. Transmission, ensure Selector Lever position is in "P".
- Vehicles with Manual Transmission, ensure Shifter Lever position is in "N" with Parking Brake applied.
- Observe all safety precautions: ⇒ "1.1 Safety Precautions", page 2
- View clean working conditions: . ⇒ "1.2 Clean Working Conditions", page 4.

Step	Procedure	Result / Action to Take
1	 PERFORM: Preliminary Check to verify the customers complaint. Refer to ⇒ "3.1 Preliminary Check", page 9 Was Complaint verified? 	 YES: GO TO: Step 2 ⇒ page 186 . NO: GATHER more information from customer about the complaint.
2	 IGNITION: OFF. DISCONNECT: Intake Manifold Runner Control Valve - N316- harness connector. CHECK: Intake Manifold Runner Control Valve - N316- component connector terminals 1 to 2 for resistance. SPECIFIED VALUE: 5 – 35 Ω (@ approx. 20° C). Was Value obtained? 	 YES: GO TO: Step 3 ⇒ page 186 . NO: REPLACE: Intake Manifold Runner Control Valve - N316 Refer to appropriate repair manual. GO TO: Step 5 ⇒ page 187 .
3 " " John Dart of In Dart of In Second	 IGNITION: ON. CHECK: Intake Manifold Runner Control Valve - N316- harness connector terminal 1 to ground for voltage. IGNITION: OFF. SPECIFIED VALUE: Battery voltage. Was Value obtained? 	 YES: GO TO: Step 4 ⇒ page 186. NO: PERFORM: Visual inspection of wiring and component. CHECK: Wiring for open, high resistance, short or harness connector for damage, corrosion, loose or broken terminals. REPAIR: Faulty wiring or connector. GO TO: Step 5 ⇒ page 187.
4	 REMOVE: Engine Control Module - J623 Refer to appropriate repair manual. CHECK: Intake Manifold Runner Control Valve - N316- harness connector terminal 2 to the Engine Control Module - J623- harness connector T60 / 20 for resistance. SPECIFIED VALUE: 0.5 Ω (± 0.3 Ω). Was Value obtained? 	 ◆ PERFORM: Visual Inspection of wiring and component. ◆ CHECK: Wiring for open, high resistance,

Step		Procedure	Result / Action to Take		
5		dure pad test to verify repair. iginal DTC return?	 YES: CHECK: Engine Control Module - J623- harness connector for any damaged, pushed-out pins. RERAIR: As necessary. If all electrical connections are OK: REPLACE: Engine Control Module - J623-Refer to appropriate repair manual. Clear the DTC's. Refer to 3.3.4 Diagnostic Mode 04 - Erase DTC Memory", page 15. Repair is complete. Generate Readiness Code. Refer to 3"3.2 Readiness Code", page 9. Return vehicle to Customer. NO: Perform the diagnostic procedure for any DTC's. If no DTC's return the repair is complete. Return vehicle to customer. 		
3.6.19 Intake Manifold Runner Position Sensor - G336- , Checking General Description The Intake Manifold Runner Position Sensor - G336- monitors the position of the intake manifold runner flaps. These flaps can be adjusted open or closed to provide longer or shorter intake runners depending on ambient conditions to increase engine efficiency. Special tools and workshop equipment required Multimeter.					
♦ Wiring Diagram.					
A C-	A Coop Tool				

Intake Manifold Runner Position Sensor 3.6.19 - G336-, Checking

General Description



- Multimeter.
- ♦ Wiring Diagram.
- ♦ Scan Tool.

- · Fuses OK.
- Battery voltage OK.
- Switch OFF All electrical and electronic accessories.
- Vehicles with Auto. Transmission, ensure Selector Lever position is in "P".
- Vehicles with Manual Transmission, ensure Shifter Lever position is in "N" with Parking Brake applied.
- Observe all safety precautions: ⇒ "1.1 Safety Precautions", page 2
 .
- View clean working conditions: . ⇒ "1.2 Clean Working Conditions", page 4



Step	Procedure	Result / Action to Take		
1	 PERFORM: Preliminary Check to verify the customers complaint. Refer to ⇒ "3.1 Preliminary Check", page 9 Was Complaint verified? 	 YES: GO TO: Step 2 ⇒ page 188 . NO: GATHER more information from customer about the complaint. 		
2	 IGNITION: OFF. DISCONNECT: Intake Manifold Runner Position Sensor - G336- harness connector. IGNITION: ON. CHECK: Intake Manifold Runner Position Sensor - G336- harness connector terminals 1 to 3 for voltage. IGNITION: OFF. SPECIFIED VALUE: About 5.0 V. Was Value obtained? 	 YES: GO TO: Step 3 page 188 . NO: GO TO: Step 4 ⇒ page 188 . 		
3	 REMOVE: Engine Control Module - J623 Refer to appropriate repair manual. CHECK Intake Manifold Runner Position Sensor - G336- harness connector terminal 2 to the Engine Control Module - J623- harness connector T60 / 59 for resistance. SPECIFIED VALUE: 0.5 Ω (± 0.3 Ω). Was Value obtained? 	 YES: REPLACE: Intake Manifold Runner Position Sensor - G336 Refer to appropriate repair manual. GO TO: Step 5 ⇒ page 189 . NO: PERFORM: Visual Inspection of wiring and component. CHECK: Wiring for open, high resistance, short or harness connector for damage, corrosion, loose or broken terminals. REPAIR: Faulty wiring or connector. GO TO: Step 5 ⇒ page 189 . 		
4	 REMOVE: Engine Control Module - J623 Refer to appropriate repair manual. CHECK: Intake Manifold Runner Position Sensor - G336- harness connector terminal 1 to the Engine Control Module - J623- harness connector T60 / 27 for resistance. CHECK: Intake Manifold Runner Position Sensor - G336- harness connector terminal 3 to the Engine Control Module - J623- harness connector T60 / 13 for resistance. SPECIFIED VALUE: 0.5 Ω (± 0.3 Ω). Were Values obtained? 	 PERFORM: Visual Inspection of wiring and component. CHECK: Wiring for open, high resistance, short or harness connector for damage, corro- 		

Step	Procedure	Result / Action to Take			
5	 Final Procedure Perform a road test to verify repair. Does the original DTC return? 	 YES: CHECK: Engine Control Module - J623- harness connector for any damaged, pushed-out pins. 			
	-	◆ REPAIR: As necessary.			
		♦ If all electrical connections are OK:			
		◆ REPLACE: Engine Control Module - J623 Refer to appropriate repair manual.			
	dul of the state o	◆ Clear the DTC's. Refer to ⇒ "3.3.4 Diagnostic Mode 04 - Erase DTC Sno Memory", page 15.			
	unlessauthorisee	◆ Repair is complete. Generate Readiness Code. Refer to ⇒ "3.2 Readiness Code", page 9.			
		◆ Return vehicle to Customer.			
	s, solotos,	 NO: ◆ Perform the diagnostic procedure for any DTC's. 			
	Whol	♦ If no DTC's return the repair is complete.			
	Torin	Return vehicle to customer.			
3.6.2 Gener	3.6.20 Knock Sensor 1 - G61- , Checking General Description The Knock Sensor 1 - G61- is a tuned accelerometer on the engine which converts engine vibration to an electrical signal. The Engine Control Module - J623- uses this signal to determine the presence of engine knock and to retard spark timing. Special tools and workshop equipment required Multimeter. Wiring Diagram. Scan Tool. Test requirements Fuses OK.				
gine w Engine	nock Sensor 1 - G61- is a tuned accelerometer on thick converts engine vibration to an electrical sign a Control Module - J623- uses this signal to determine of engine knock and to retard spark timing.	the en- al. The nine the			
Specia	al tools and workshop equipment required	auro			
♦ Mu	Itimeter.	(40)			
♦ Wii	Multimeter. Wiring Diagram. Scan Tool. est requirements				
	an Tool. Protected by	NeW ^O I ^V			
	equirements				
	• Fuses OK.				
• Bat	Battery voltage OK.				
• Sw	Switch OFF All electrical and electronic accessories.				

Knock Sensor 1 - G61-, Checking 3.6.20

General Description

Special tools and workshop equipment required

- Multimeter.
- Wiring Diagram.
- ♦ Scan Tool.

Test requirements

- · Fuses OK.
- Battery voltage OK.
- Switch OFF All electrical and electronic accessories.

- Vehicles with Auto. Transmission, ensure Selector Lever position is in "P".
- Vehicles with Manual Transmission, ensure Shifter Lever position is in "N" with Parking Brake applied.
- Observe all safety precautions: ⇒ "1.1 Safety Precautions", page 2
- View clean working conditions: . ⇒ "1.2 Clean Working Conditions", page 4.

Step		Procedure	Result / Action to Take
1	-	PERFORM: Preliminary Check to verify the customers complaint. Refer to ⇒ "3.1 Preliminary Check", page 9 . Was Complaint verified?	 YES: GO TO: Step 2 ⇒ page 190 . NO: GATHER more information from customer about the complaint.
3		REMOVE: Engine Control Module - J623 Refer to appropriate repair manual. CHECK: Knock Sensor 1 - G61- harness connector terminal 1 to the Engine Control Module - J623- harness connector T60 / 25 for resistance. CHECK: Knock Sensor 1 - G61- harness connector terminal 2 to the Engine Control Module - J623- harness connector T60 / 10 for resistance. CHECK: Knock Sensor 1 - G61- harness connector terminal 3 to the Engine Control Module - J623- harness connector T60 / 8 for resistance.	 PERFORM: Visual Inspection of wiring and component. CHECK: Wiring for open, high resistance, short or harness connector for damage, corrosion, loose or broken terminals. REPAIR: Faulty wiring or connector. GO TO: Step 4 ⇒ page 190.
	•	SPECIFIED VALUE: 0.5Ω (± 0.3Ω).	
4	•	Final Procedure Perform a road test to verify repair. Does the original DTC return?	 YES: CHECK: Engine Control Module - J623- har ness connector for any damaged, pushed-out pins. REPAIR: As necessary. If all electrical connections are OK: REPLACE: Engine Control Module - J623 Refer to appropriate repair manual. Clear the DTC's. Refer to ⇒ "3.3.4 Diagnostic Mode 04 - Erase DTC Memory", page 15 Repair is complete. Generate Readiness Code. Refer to ⇒ "3.2 Readiness Code", page 9 Return vehicle to Customer. NO: Perform the diagnostic procedure for any DTC's. If no DTC's return the repair is complete. Return vehicle to customer.

3.6.21 Leak Detection Pump - V144-, Check-

General Description

Whenever the engine is running, vacuum is applied to the Vacuum Switch. This switch applies vacuum to the Upper Chamber of the pump when it receives a ground signal from the Engine Control Module - J623- . This signal is a duty cycle pulse of approximately 40%. When vacuum is applied to the Upper Chamber, fresh air flows in through the One-way Inlet Valve, compressing the spring above the diaphragm. When the Diaphragm begins to rise, the Reed Switch, attached to the Dia-phragm Rod, opens. When the Vacuum Switch closes, the vacuum in the Upper Chamber is released. As a result, the spring pushes the Diaphragm down. As the Diaphragm is pushed down, the air in the Lower Chamber is pushed out of the One-way Outlet Valve into the EVAP system. This process continues until the pressure in the EVAP system no longer allows the spring to push the Diaphragm down. With tension on the Diaphragm, the ECM waits for a certain period of time to watch for the Diaphragm to fall. The Reed Switch closing signals that the Diaphragm has fallen to its lowest point. When the Reed Switch closes, the ECM may cycle the LDP to build up system pressure again. The ECM measures the time it takes for the Reed Switch to close once the LDP has stopped running to determine if there is a leak in the system. The slower the Diaphragm falls after the pump stops running, the less air is leaking out of the EVAP system.

Special tools and workshop equipment required

- Multimeter.
- Scan Tool.

Test requirements

waits f fall. Th en to it may cy measu LDP h system ning, tl	aphragm down. With tension on the Diaphragm the or a certain period of time to watch for the Diaphragm to e Reed Switch closing signals that the Diaphragm is lowest point. When the Reed Switch closes, the ycle the LDP to build up system pressure again. The state of the time it takes for the Reed Switch to close cas stopped running to determine if there is a leak in the slower the Diaphragm falls after the pump stope less air is leaking out of the EVAP system.	e ECM		
Specia	tools and workshop equipment required	WHITT!		
♦ Mg	timeter.	aspec		
♦ War	ing Diagram.	Stott		
♦ Sca	an Tool.	ne co		
Test	equirements	rrectr		
• Fu	ses OK.	less		
• Bat	tery voltage OK.	of info		
• Sw	tch OFF All electrical and electronic accessories.	J. Marine		
 Vel sitio 	nicles with Auto. Transmission, ensure Selector Leon is in "P".	ever po-		
 Vel sitio 	nicles with Manual Transmission, ensure Shifter Leon is in "N" with Parking Brake applied.	ever po-		
• Ob:	Observe all safety precautions: ⇒ "1.1 Safety Precautions", page 2.			
⇒ "	1.1 Safety Precautions", page 2.	NO NO WOLLD		
⇒ " • Vie ⇒ "	w clean working conditions: . 1.2 Clean Working Conditions: . 1.2 Clean Working Conditions", page 4	10 V Kd Mgin		
⇒ " • Vie ⇒ " Test P	w clean working conditions: . 1.2 Clean Working Conditions: , page 4 . 94 Uabens rocedure	10 V V d'HUT.		
→ " • Vie → " Test P	w clean working conditions: . 1.2 Clean Working Conditions", page 4 . 194 UPPER PROCEEDINGS rocedure Procedure	Result / Action to Take		
• Vie ⇒ " Test P Step 1	## 1.1 Safety Precautions", page 2 w clean working conditions: 1.2 Clean Working Conditions", page 4 rocedure Procedure PERFORM: Preliminary Check to verify the customers complaint. Refer to ⇒ "3.1 Preliminary Check", page 9	Result / Action to Take - YES: ♦ GO TO: Step 2 ⇒ page 192. - NO:		
→ " • Vie → " Test P Step 1	## Complaint verified? ### Complaint verified? ### Complaint Precedure ### Complaint verified #### Complaint verified #### Complaint verified #### Complaint verified ####################################	Result / Action to Take - YES: ◆ GO TO: Step 2 ⇒ page 192 . - NO: ◆ GATHER more information from customer about the complaint.		
• Vie • Yie • Yie Step 1	or a certain period of time to watch for the Diaphrage Reed Switch closing signals that the Diaphragm is lowest point. When the Reed Switch closes, the yole the LDP to build up system pressure again. The great trakes for the Reed Switch to close of as stopped running to determine if there is a leak in the slower the Diaphragm falls after the pump stone less air is leaking out of the EVAP system. Altools and workshop equipment required litimeter. In Diagram. In Tool. In Tool. In Tool. In Tool with Auto. Transmission, ensure Selector Lean is in "P". In Tools with Manual Transmission, ensure Shifter Lean is in "P". In It is safety precautions: 1.1 Safety Precautions: 1.2 Clean Working Conditions: 1.2 Clean Working Conditions: 1.3 Preliminary Check to verify the customers complaint. Refer to 3.1 Preliminary Check", page 9. Was Complaint verified?	Result / Action to Take - YES: ◆ GO TO: Step 2 ⇒ page 192. - NO: ◆ GATHER more information from customer about the complaint.		
• Vie • Yie Test P Step 1	## Conditions 1.1 Safety Precautions", page 2 1.2 Clean Working Conditions 1.2 Clean Working Conditions", page 4 1.2 Clean Working Conditions", page 4 1.2 Clean Working Conditions 1.2 Clean Working Condit	Result / Action to Take - YES: ◆ GO TO: Step 2 ⇒ page 192. - NO: ◆ GATHER more information from customer about the complaint. 3. Diagnosis and Testing		

Step		Procedure	Result / Action to Take	
2	•	IGNITION: OFF.	→ 0	YES: AG. Volkswagen AG does 192 (Querant
	•	DISCONNECT: Leak Detection Pump - V1442 harness connector.	 	NO: PERFORM: Visual Inspection of wiring and
	•	IGNITION: ON.		component.
	•	CHECK: Leak Detection Pump V144- harness connector terminal 3 to ground for voltage.	•	CHECK: Wiring for open, high resistance, short or harness connector for damage, corrosion, loose or broken terminals.
	•	IGNITION: OFF.	*	REPAIR: Faulty wiring or connector.
	•	SPECIFIED VALUE: Battery voltage.	♦	GO TO: Step 5 <u>⇒ page 193</u> .
	<u> </u>	Was Value obtained?		
3	•	REMOVE: Engine Control Module - J623 Refer to appropriate repair manual.	→	YES: GO TO: Step 4 ⇒ page 192 .
	•	CHECK: Leak Detection Pump - V144- harness connector terminal to the Engine Control Module - J623- harness connector T94 / 44 for resistance.	•	GO TO: Step 5 ⇒ page 193. YES: GO TO: Step 4 ⇒ page 192. NO: PERFORM: Visual Inspection of wiring and component. CHECK: Wiring for open, high resistance, short or harness connector for damage, corrosion league or broken terminals.
		CHECK: Leak Detection Pump - V144- harness connector terminal 2 to the Engine Con-	*	Sion, loose of broken terminals.
		trol Module - J623- harness connector T94 / 49 for resistance.	•	REPAIR: Faulty wiring or connector.
		SPECIFIED VALUE: $0.5 \Omega (\pm 0.3 \Omega)$.	•	REPAIR: Faulty wiring or connector. GO TO: Step 5 ⇒ page 193.
	_	Were Values obtained?		100 100
4	•	CONNECT: Leak Detection Pump - V144 harness connector.	- ♠,	YES: GO TO: Step 5 page 193 or Korufin to Only 1980 or On
	•	CONNECT: Engine Control Module - J623-harness connector T94 / 49 to ground.	-	REPLACE: Leak Detection Pump - V144 Re-
	•	CHECK: Leak Detection Pump - V144- for operation.	•	fer to appropriate repair manual. GO TO: Step 5 <u>⇒ page 193</u> .
	•	SPECIFIED VALUE: Leak Detection Pump - V144- should be heard running.		
	_	Was Value obtained?		

5	Procedure	Result / Action to Take	
	 Final Procedure Perform a road test to verify repair. Does the original DTC return? 	 YES: CHECK: Engine Control Module - J623- harness connector for any damaged, pushed-out pins. REPAIR: As necessary. If all electrical connections are OK: 	
		 REPLACE: Engine Control Module - J623 Refer to appropriate repair manual. Clear the DTC's. Refer to ⇒ "3.3.4 Diagnostic Mode 04 - Erase DTC Memory", page 15. Repair is complete. Generate Readiness Code. Refer to ⇒ "3.2 Readiness Code", page 9. Return vehicle to Customer. NO: Perform the diagnostic procedure for any DTC's. If no DTC's return the repair is complete. 	
		Return vehicle to customer.	
	Mass Airflow Sensor - G70-, Che ral Description ignal from the Mass Airflow Sensor is used in the E ol Module - J623- to calculate the volumetric efficient on the volumetric efficiency, and taking into considerable value and ignition timing, the Engine Control B- calculates the engine torque. al tools and workshop equipment required aultimeter. Iring Diagram.	ever po- ever po- ever po- 3. Diagnosis and Testing	
Sc	an Tool.	three.	
Fu	ultimeter. ring Diagram. an Tool. requirements ses OK. uttery voltage OK.	spect to me	
Sv	vitch OFF All electrical and electronic accessories.		
siti	hicles with Auto. Transmission, ensure Selector Le ion is in "P".	ever po-	
Ve	chicles with Manual Transmission, ensure Shifter Le ion is in "N" with Parking Brake applied.	ever po-	
sit	Observe all safety precautions: ⇒ "1.1 Safety Precautions", page 2.		
siti Ob <u>⇒</u>	ew clean working conditions: . 1.2 Clean Working Conditions", page 4	2	





Step	Procedure	Result / Action to Take
1	 PERFORM: Preliminary Check to verify the customers complaint. Refer to ⇒ "3.1 Preliminary Check", page 9 Was Complaint verified? 	 YES: GO TO: Step 2 ⇒ page 194 . NO: GATHER more information from customer about the complaint.
2	 CONNECT: Scan tool . START: Engine and let Idle. CHECK: The air flow quantity of the Mass Air Flow Sensor - G70 IGNITION: OFF. SPECIFIED VALUE: About 2 to 5 g/s. Was Value obtained? 	 YES: Condition may be intermittent. PERFORM: Visual Inspection of wiring and component. CHECK: Wiring for open, high resistance, short or harness connector for damage, corrosion, loose or broken terminals. REPAIR: Faulty wiring or connector. GO TO: Step 5 ⇒ page 195. NO: GO TO: Step 3 ⇒ page 194.
3	 DISCONNECT: Mass Airflow Sensor G70-harness connector. IGNITION: ON. CHECK: Mass Airflow Sensor - G70- harness connector terminal 3 to ground for voltage. IGNITION: OFF. SPECIFIED VALUE: Battery voltage. Was Value obtained? 	 YES GO TO: Step 4 ⇒ page 194 . NO: PERFORM: Visual Inspection of wiring and component. CHECK: Wiring for open, high resistance, short or harness connector for damage, corrosion, loose or broken terminals. REPAIR: Faulty wiring or connector. GO TO: Step 5 ⇒ page 195 .
4	 REMOVE: Engine Control Module - J623 Refer to appropriate repair manual. CHECK: Mass Airflow Sensor - G70- harness connector terminal 1 to the Engine Control Module J623- harness connector T94 / 23 for resistance. CHECK: Mass Airflow Sensor - G70- harness connector terminal 2 to the Engine Control Module - J623- harness connector T94 / 65 for resistance. CHECK: (3C / 357 only) Mass Airflow Sensor - G70- harness connector terminal 4 to the Engine Control Module - J623- harness connector T94 / 12 for resistance. CHECK: (3C / 357 only) Mass Airflow Sensor - G70- harness connector terminal 5 to the Engine Control Module - J623- harness connector T94 / 60 for resistance. SPECIFIED VALUE: 0.5 Ω (± 0.3 Ω). Were Values obtained? 	 NO: PERFORM: Visual Inspection of wiring and component. CHECK: Wiring for open, high resistance, short or harness connector for damage, corrosion, loose or broken terminals. REPAIR: Faulty wiring or connector.

Step	Procedure	Result / Action to Take		
5	 Final Procedure Perform a road test to verify repair. Does the original DTC return? 	 YES: CHECK: Engine Control Module - J623- harness connector for any damaged, pushed-out pins. 		
	Boos the original BTO retains	♦ REPAIR: As necessary.		
		♦ If all electrical connections are OK:		
		◆ REPLACE: Engine Control Module - J623 Refer to appropriate repair manual.		
		◆ Clear the DTC's. Refer to ⇒ "3.3.4 Diagnostic Mode 04 - Erase DTC Memory", page 15.		
		 Repair is complete. Generate Readiness Code. Refer to ⇒ "3.2 Readiness Code", page 9 		
		◆ Return vehicle to Customer.		
		NO:◆ Perform the diagnostic procedure for any DTC's.		
		◆ If no DTC's return the repair is complete.		
	Jolkswagen AG. Volk	₩ ^a Return vehicle to customer.		
3.6.2	200	Power		
	Supply Relay - J271- , Checking	32		
The fo	ral Description Sollowing procedure is used to diagnose the Motronic of Module Power Supply Relay - J271- and the Engi odule - J623- power supply voltage that is provided nic Engine Centrol Module Power Supply Relay - J	ne Con-		
Specia	al tools and workshop equipment required	the cc		
_	ıltimeter. 🧏	prrect		
♦ Wii	ring Diagram	ness		
	an Tool. de leigh	of inte		
	equirements ses OK.	m_{a_t}		
		Oning		
	ttery voltage OK. Section of the voltage OK. Section of the voltage OK. Section of the voltage o	No.		
	hicles with Auto. Transmission, ensure Selector Le	Wer no		
siti	on is in "P".	, murdon		
 Vel sitie 	• Vehicles with Manual Transmission ensure Shifter Lever position is in "N" with Parking Brake applied only a strong to the strong brake applied only a strong brake applied on the strong brake appli			
	Observe all safety precautions: ⇒ "1.1 Safety Precautions", page 2.			
	 View clean working conditions: . ⇒ "1.2 Clean Working Conditions", page 4 			

Motronic Engine Control Module Power 3.6.23 Supply Relay - J271-, Checking

General Description

Special tools and workshop equipment required

- Multimeter.
- Wiring Diagram
- Scan Tool.

- Fuses OK.
- Battery voltage OK.
- Switch OFF All electrical and electronic accessories.
- Vehicles with Auto. Transmission, ensure Selector Lever position is in "P".
- Vehicles with Manual Transmission, ensure Shifter Lever position is in "N" with Parking Brake applied on a position is in "N" with Parking Brake applied on "N" with Parking Brake applied on a position is in "N" with Parking Brake applied on a position is in "N" with Parking Brake applied on a position is in "N" with Parking Brake applied on a position is in "N" with Parking Brake applied on a position is in "N" with Parking Brake applied on a position is in "N" with Parking Brake applied on a position is in "N" with Parking Brake applied on "N" with Parking Bra
- Observe all safety precautions: ⇒ "1.1 Safety Precautions", page 2
- View clean working conditions: . ⇒ "1.2 Clean Working Conditions", page 4 .

Test P	roc	cedure Procedure ised by Volkswagen AG	.Vc	lkswagen AG does no.
Step		Procedure jijsedby Vo.		Result Action to Take
1	-	PERFORM: Preliminary Check to verify the customers complaint. Refer to ⇒ "3.1 Preliminary Check", page 9. Was Complaint verified?	- ◆	YES: GO TO: Step 2 <u>⇒ page 196</u> . NO: GATHER more information from customer about the complaint.
2	•	IGNITION: OF E.	7	YES:
	•	DISCONNECT: Motronic Engine Control Module Power Supply Relay - J271- from the SB Fuse box in the engine compartment.	♦	GO TO: Step 3 <u>⇒ page 196</u> . NO: PERFORM: Visual Inspection of wiring and component.
	•	IGNITION: ON.	•	CHECK: Wiring for open, high resistance,
	•	CHECK: Motronic Engine Control Module Power Supply Relay - J271- socket terminals 30 and 85 to ground for voltage.	•	short or harness connector for damage, corrosion, loose or broken terminals.
		IGNITION: OFF.	•	REPAIR: Faulty wiring or connector
		SPECIFIED VALUE: Battery voltage.	•	GO TO: Step 6 ⇒ page 197 .
		Were Values obtained?		GO TO: Step 6 ⇒ page 197.
3	•	REMOVE: Engine Control Module - J623 Refer to appropriate repair manual.	- •	YES: GO TO: Step 4 <u>⇒ page 196</u>
	•	CONNECT: Jumper wire, Motronic Engine Control Module Power Supply Relay - J271-socket terminals 30 and 87.	•	GO TO: Step 5 ⇒ page 197
	•	IGNITION: ON.		DA nagen Ray Volkewagen AG.
	•	CHECK: Engine Control Module - J623- harness connector T94 / 3, 5 and 6 to ground for voltage.		
	•	IGNITION: OFF.		
	•	SPECIFIED VALUE: Battery voltage.		
	_	Were Values obtained?		
4	•	REMOVE: Jumper wire, Motronic Engine Control Module Power Supply Relay - J271- socket terminals 30 and 87. CHECK: Motronic Engine Control Module	•	YES: REPLACE: Motronic Engine Control Module Power Supply Relay - J271 Refer to appro- priate repair manual.
		Power Supply Relay - J271- socket terminal 86	♦	GO TO: Step 6 <u>⇒ page 197</u> .
		to the Engine Control Module - J623- harness connector T94 / 69 for resistance.	_	NO:
	•	SPECIFIED VALUE: 0.5 Ω (± 0.3 Ω).	•	PERFORM: Visual Inspection of wiring and component.
	-	Was Value obtained?	•	CHECK: Wiring for open, high resistance, short or harness connector for damage, corrosion, loose or broken terminals.
			♦	REPAIR: Faulty wiring or connector.
			♦	GO TO: Step 6 ⇒ page 197 .

Step		Procedure		Result / Action to Take
5	•	REMOVE: Jumper wire, Motronic Engine Control Module Power Supply Relay - J271- socket terminals 30 and 87.	-	YES: REPLACE: Fuse Panel B - SB- fuse box. Refer to appropriate repair manual.
	•	REMOVE: Appropriate fuse On Fuse Panel B. Refer to appropriate repair manual.	•	GO TO: Step 6 ⇒ page 197 .
	•	CHECK: Downstream (output) side of appropriate fuse On Fuse Panel B to the Engine		NO: PERFORM: Visual Inspection of wiring and component.
		Control Module - J623- harness connector T94 / 3, 5 and 6 for resistance.	♦ Ot 9	CHECK: Wiring for open, high resistance, short or harness connector for damage, corrosion, loose or broken terminals.
	_	SPECIFIED VALUE: $0.5 \Omega (\pm 0.3 \Omega)$. Were Values obtained?	•	REPAIR: Faulty wiring or connector.
		, ed lines		GO TO: Step 6 ⇒ page 197 .
6	6, 1811 ₀₁	Final Procedure Perform a road test to verify repair. Does the original DTC return?		YES: CHECK: Engine Control Module - J623- harness connector for any damaged, pushed-out pins.
rinwı			•	REPAIR: As necessary.
art o			•	If all electrical connections are OK:
es, in		•	REPLACE: Engine Control Module - J623 Refer to appropriate repair manual.	
rcial purposes, in part or in w			•	Clear the DTC's. Refer to ⇒ "3.3.4 Diagnostic Mode 04 - Erase DTC Memory", page 15.
),/-	COMMIN		*	Repair is complete. Generate Readiness Code. Refer to \$\(\sigma \) "3.2 Readiness Code", page 9 .
			•	Return vehicle to Customer.
		DA NB BENNEY CODY TO BE THE STATE OF THE STA		NO: Perform the diagnostic procedure for any DTC's.
		Anagen AG. Protected by copyri	\\``	If no DTC's return the repair is complete. Return vehicle to customer.
		, J		Neturn verilcie to customer.

3.6.24 Oxygen Sensor 1 After Catalytic Converter - GX7-, Checking

General Description

The Oxygen Sensor 1 After Catalytic Converter - GX7- downstream of the primary catalytic converter supplies the Engine stream of the primary catalytic converter supplies the Engine Control Module - J623- with a voltage signal (nonlinear) indicating "rich" or "lean. If the primary catalytic converter is supersaturated with oxygen (lean mixture), Oxygen Sensor 1 After Catalytic Converter - GX7- will send the Engine Control Module - J623- a nonlinear signal indicating the lean mixture condition. The mixture is then enriched with fuel until the oxygen has been "displaced" from the catalytic converter. This condition, in turn, is registered by Oxygen Sensor 1 After Catalytic Converter - GX7- as a nonlinear signal indicating the rich mixture condition. The mixture is then leaned out by the Engine Control Module - J623- If the then leaned out by the Engine Control Module - J623- . If the nonlinear signal is received again, the mixture will again be enriched. The frequency, or period, during which the mixture is enriched or leaned out is variable, being dependent on the gas flow rate (engine load) at that moment.

Note the Oxygen Sensor 1 After Catalytic Converter - GX7- is also referred to as the Oxygen Sensor After Three Way Catalytic Converter - G130- .

The Oxygen Sensor 1 After Catalytic Converter - GX7- contains the following components:

- ◆ Oxygen Sensor After Three Way Catalytic Converter G130-
- Heater For Oxygen Sensor 1 After Catalytic Converter Z29-

The Oxygen Sensor 1 After Catalytic Converter - GX7- components cannot be serviced separately, it must be serviced as a unit.

Special tools and workshop equipment required

- Multimeter.
- Wiring Diagram.
- Scan Tool.

Test requirements

- Fuses OK.
- Battery voltage OK.
- Switch OFF All electrical and electronic accessories.
- Vehicles with Auto. Transmission, ensure Selector Lever position is in "P".
- es.

 Ir Lever po
 IN Lever po
 AG. Volkswagen AG does not guarantee of acceptantee. Vehicles with Manual Transmission, ensure Shifter Lever position is in "N" with Parking Brake applied
- Observe all safety precautions: ⇒ "1.1 Safety Precautions", page 2
- View clean working conditions: ⇒ "1.2 Clean Working Conditions", page 4.

Step	Procedure	Result / Action to Take
1 •	PERFORM: Preliminary Check to verify the customers complaint. Refer to Oxygen Sensor Preliminary Tests∄n ⇒ "3.1 Preliminary Check", page 9 Was Complaint verified?	 YES: GO TO: Step 2 ⇒ page 198. NO: GATHER more information from customer about the complaint.
2 .	IGNITION: OFF. DISCONNECT: Oxygen Sensor 1 Before Catalytic Converter - GX10- harness connector. CHECK: Oxygen Sensor 1 Before Catalytic Converter - GX10- component connector terminals 1 to 2 for resistance. SPECIFIED VALUE: 2 – 4 Ω (@ 25° C). Was Value obtained?	 NO: REPLACE: Oxygen Sensor 1 Before Catalytic Converter - GX10 Refer to appropriate repair manual. GO TO: Step 6 ⇒ page 200 .

Step	Procedure	Result / Action to Take
3	 IGNITION: ON. CHECK: Oxygen Sensor 1 Before Catalytic Converter - GX10- harness connector terminal 1 to ground for voltage. IGNITION: OFF. SPECIFIED VALUE: Battery voltage. Was Value obtained? 	 YES: GO TO: Step 4 ⇒ page 199 . NO: PERFORM: Visual Inspection of wiring and component. CHECK: Wiring for open, high resistance, short or harness connector for damage, corrosion, loose or broken terminals. REPAIR: Faulty wiring or connector. GO TO: Step 6 ⇒ page 200 .
4	 RECONNECT: Oxygen Sensor 1 Before Catalytic Converter - GX10- harness connector. CONNECT: Scan Tool. START: Engine and let Idle. Perform the function test located in diagnostic mode 06. Refer to appropriate Diagnostic Mode 06 - Read Test Results for Specific Diagnostic Functions, ⇒ "3.3 Diagnostic Modes 01 - 09", page 11. IGNITION: OFF. SPECIFIED VALUE: Mode 6 Pass. Were Values obtained? 	 YES: FAULT: Is intermittent. PERFORM: Visual Inspection of wiring and component. CHECK: Wiring for open, high resistance, short or harness connector for damage, corrosion, loose or broken terminals. REPAIR: Faulty wiring or connector. GO TO: Step 6 ⇒ page 200. NO: GO TO: Step 5 ⇒ page 199.
5	 REMOVE: Engine Control Module - J623- Refer to appropriate repair manual. CHECK: Oxygen Sensor 1 Before Catalytic Converter - GX10- harness connector terminal 2 to the Engine Control Module - J623- harness connector T94 / 29 for resistance. CHECK: Oxygen Sensor 1 Before Catalytic Converter - GX10- harness connector terminal 3 to the Engine Control Module - J623- harness connector T94 / 34 for resistance. CHECK: Oxygen Sensor 1 Before Catalytic Converter - GX10- harness connector terminal 4 to the Engine Control Module - J623- harness connector T94 / 62 for resistance. SPECIFIED VALUE: 0.5 Ω (± 0.3 Ω). Were Values obtained? 	 NO.3101d PERFORM: Visual Inspection of wiring and

Step	Procedure	Result / Action to Take
6	 Final Procedure Perform a road test to verify repair. Does the original DTC return? 	 YES: ◆ CHECK: Engine Control Module - J623- harness connector for any damaged, pushed-out pins.
	2 000 and ongina. 2 v o votamin	♦ REPAIR: As necessary.
		♦ If all electrical connections are OK:
		♦ REPLACE: Engine Control Module - J623 Refer to appropriate repair manual.
		◆ Clear the DTC's. Refer to ⇒ "3.3.4 Diagnostic Mode 04 - Erase DTC Memory", page 15.
		 Repair is complete. Generate Readiness Code. Refer to ⇒ "3.2 Readiness Code", page 9
		♦ Return vehicle to Customer.
		 NO: ◆ Perform the diagnostic procedure for any DTC's.
		♦ If no DTC's return the repair is complete.
		Return vehicle to customer.

3.6.25 Oxygen Sensor 1 Before Catalytic Converter - GX10- , Checking

General Description

The Oxygen Sensor 1 Before Catalytic Converter - GX10- does not actually measure oxygen concentration, but rather the difference between the amount of oxygen in the exhaust gas and the amount of oxygen in air. Rich mixture causes an oxygen demand. This demand causes a voltage to build up, due to transportation of oxygen ions through the Oxygen Sensor 1 Before Catalytic Converter - GX10- layer. Lean mixture causes low voltage, since there is an oxygen excess. The Oxygen Sensor 1 Before Catalytic Converter GX10- and catalytic converters are used in order to reduce exhaust emissions. Information on oxygen concentration is sent to Engine Control Module - J623-, which adjusts the amount of fuel injected into the engine to compensate for excess air or excess fuel. The Engine Control Module - J623- attempts to maintain, on average, a certain air-fuel ratio by interpreting the information it gains from the Heated Oxygen Sensor - G39-. The primary goal is a compromise between power, fuel economy, and emissions. The heater for Oxygen Sensor 1 Before Catalytic Converter - GX10- is designed to minimize the time-to-readiness for closed-loop operation by heating the Oxygen Sensor 1 Before Catalytic Converter - GX10- as quickly as possible.

Note the Oxygen Sensor 1 Before Catalytic Converter - GX10- is also referred to as the Heated Oxygen Sensor - G39- .

The Oxygen Sensor 1 Before Catalytic Converter - GX10- contains the following components:

- Heated Oxygen Sensor G39-
- Oxygen Sensor Heater Z19-

The Oxygen Sensor 1 Before Catalytic Converter - GX10- components cannot be serviced separately, it must be serviced as a unit.

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Special tools and workshop equipment required

- ♦ Multimeter.
- Wiring Diagram.
- ♦ Scan Tool.

Test requirements

- · Fuses OK.
- Battery voltage OK.

- Switch OFF All electrical and electr

	, p				
Step	Procedure	Result / Action to Take			
J. Purposes, inpart o	 PERFORM: Preliminary Check to verify the customers complaint. Refer to Oxygen Sensor Preliminary Tests in ⇒ "3.1 Preliminary Check", page 9 Was Complaint verified? 	 YES: GO TO: Step 2 ⇒ page 201 . NO: GATHER more information from customer about the complaint. 			
2	 IGNITION: OFF. DISCONNECT: Oxygen Sensor 1 Before Catalytic Converter - GX10- harness connector. CHECK: Oxygen Sensor 1 Before Catalytic Converter - GX10- component connector terminals 3 to 4 for resistance. SPECIFIED VALUE: 2 – 4 Ω (@ 25° C). Was Value obtained? 	 YES: GO TO: Step 3 page 201. NO: REPLACE: Oxygen Sensor 1 Before Catalytic Converter - GX10 Refer to appropriate repair manual. GO TO: Step 6 page 203. 			
3	 IGNITION: ON. CHECK: Oxygen Sensor 1 Before Catalytic Converter - GX10- harness connector terminal 4 to ground for voltage. IGNITION: OFF. SPECIFIED VALUE: Battery voltage. Was Value obtained? 	 YES: GO TO: Step 4 ⇒ page 202. NO: PERFORM: Visual Inspection of wiring and component. CHECK: Wiring for open, high resistance, short or harness connector for damage, corrosion, loose or broken terminals. REPAIR: Faulty wiring or connector. GO TO: Step 6 ⇒ page 203. 			

Step		Procedure en AG. Volkswagen AG d	200	Result / Action to Take
4	•	RECONNECT: Oxygen Sensor 1 Before Catalytic Converter - GX10- harness connector.	-	YES: FAULT: Is intermittent.
	•	CONNECT: Scan Tool.	•	PERFORM: Visual Inspection of wiring and component.
	•	START: Engine and let Idle.	•	CHECK: Wiring for open, high resistance,
	•	Perform the function test located in diagnostic mode 06. Refer to appropriate Diagnostic Mode 06 - Read Test Results for Specific Di-		short or harness connector for damage, corrosion, loose or broken terminals.
	1,4/1	agnostic Functions, ⇒ "3.3 Diagnostic Modes 01 - 09", page 11.	♦	REPAIR: Faulty wiring or connector.
	or in u	IGNITION: OFF.	•	GO TO: Step 6 ⇒ page 203 .
	bart	SPECIFIED VALUE: Mode 6 Pass.	-	NO: GO TO: Step 5 <u>⇒ page 202</u> .
	ses, in	Were Values obtained?		rectr
5	70	DISCONNECT: Oxygen Sensor 1 Before Catalytic Converter - GX10- harness connector.	-	YES: REPLACE: Oxygen Sensor 1 Before Catalytic Converter - GX10 Refer to appropriate repair
	• 5	REMOVE: Engine Control Module - J623 Refer to appropriate repair manual.		manual.
	•	CHECK: Oxygen Sensor 1 Before Catalytic Converter - GX10- harness connector terminal 1 to the Engine Control Module - J623- harness connector T94 / 78 for resistance.	 NO: PERFORM: Visual Ir component. CHECK: Wiring for o short or harness consistent of harness	PERFORM: Visual Inspection of wiring and
	•	CHECK: Oxygen Sensor 1 Before Catalytic Converter - GX10- harness connector terminal 2 to the Engine Control Module - J623- harness connector T94 / 79 for resistance		CHECK: Wiring for open, high resistance, short or harness connector for damage, corrosion, loose or broken terminals.
	•	CHECK: Oxygen Sensor 1 Before Catalytic Converter - GX10- harness connector terminal 3 to the Engine Control Module - J623- harness connector T94 / 73 for resistance.		^REPAIR: Faulty wiring or connector. GO TO: Step 6 ⇒ page 203 .
	•	CHECK: Oxygen Sensor 1 Before Catalytic Converter - GX10- harness connector terminal 5 to the Engine Control Module - J623- harness connector T94 / 56 for resistance.		
	•	CHECK: Oxygen Sensor 1 Before Catalytic Converter - GX10- harness connector terminal 6 to the Engine Control Module - J623- harness connector T94 / 57 for resistance.		
	•	SPECIFIED VALUE: 0.5 Ω (\pm 0.3 Ω).		
	_	Were Values obtained?		

Step	Procedure	Result / Action to Take
6	 Final Procedure Perform a road test to verify repair. Does the original DTC return? 	 YES: ◆ CHECK: Engine Control Module - J623- harness connector for any damaged, pushed-out pins.
		♦ REPAIR: As necessary.
		◆ If all electrical connections are OK:
		◆ REPLACE: Engine Control Module - J623 Refer to appropriate repair manual.
		◆ Clear the DTC's. Refer to ⇒ "3.3.4 Diagnostic Mode 04 - Erase DTC Memory", page 15.
	gen AG. Vo	◆ Repair is complete. Generate Readiness Code. Refer to ⇒ "3.2 Readiness Code", page 9
	hy Volkswagen Ad. Vo	◆ Return vehicle to Customer.
	ales sautrorised U	- NO: ◆ Perform the diagnostic procedure for any DTC's.
	#0alli	♦ If no DTC's return the repair is complete.
		Return vehicle to customer.

arter - GX11- does
...n, but rather the differ...in the exhaust gas and the
... mixture causes an oxygen de... oxygen de... oxygen excess. The Oxygen Sensor 2 Before
... oxygen excess. The Oxygen Sensor 2
... which adjusts the amount of fuel injected into the engine to compensate
for excess air or excess fuel. The Engine Control Module - J623;
attempts to maintain, on average, a certain air-fuel ratio by infer
preting the information it gains from the Oxygen Sensor 2 Before
Catalytic Converter - GX11-. The primary goal is a compromise violation of the control will be the control of the control

The Oxygen Sensor 2 Before Catalytic Converter - GX11- components cannot be serviced separately, it must be serviced as a

Special tools and workshop equipment required

- Multimeter.
- Wiring Diagram.
- Scan Tool.

Test requirements

- Fuses OK.
- Battery voltage OK.
- Switch OFF All electrical and electronic accessories.
- Vehicles with Auto. Transmission, ensure Selector Lever position is in "P".
- Vehicles with Manual Transmission, ensure Shifter Lever position is in "N" with Parking Brake applied.
- Observe all safety precautions: ⇒ "1.1 Safety Precautions", page 2
- View clean working conditions: . ⇒ "1.2 Clean Working Conditions", page 4.

Step	Procedure	Result / Action to Take					
1	 PERFORM: Preliminary Check to verify the customers complaint. Refer to ⇒ "3.1 Preliminary Check", page 9 Was Complaint verified? 	 YES: GO TO: Step 2 ⇒ page 204 . NO: GATHER more information from customer AG. about the complaint. 					
2	 IGNITION: OFF. DISCONNECT: Oxygen Sensor 2 Before Catalytic Converter - GX11- harness connector. CHECK: Oxygen Sensor 2 Before Catalytic Converter - GX11- component connector terminals 1 to 2 for resistance. SPECIFIED VALUE: 1 – 5 Ω (@ 25° C). 	 YES: GO TO: Step 3 ⇒ page 204 . NO: REPLACE: Oxygen Sensor 2 Before Catalytic Converter - GX11 Refer to appropriate repair manual. 					
3	 Was Value obtained? IGNITION: ON. CHECK: Oxygen Sensor 2 Before Catalytic Converter - GX 11- harness connector terminal 1 to ground for voltage. IGNITION: OFF. SPECIFIED VALUE: Battery voltage. Was Value obtained? 	 PERFORM: Visual Inspection of wiring and component. CHECK: Wiring for open, high resistance, short or harness connector for damage corrosion, loose or broken terminals. REPAIR: Faulty wiring or connector. 					
204	© GO TO: Step 8 ⇒ page 206. GO TO: Step 8 ⇒ page 206.						

Step		Procedure		Result / Action to Take
4	•	RECONNECT: Oxygen Sensor 2 Before Catalytic Converter - GX11- harness connector.	-	YES: GO TO: Step 5 <u>⇒ page 205</u> .
		CONNECT: Scan Tool.	_	NO:
	•	START: Engine and let Idle.	•	GO TO: Step 6 <u>⇒ page 205</u> .
	•	Perform the function test located in Diagnostic Mode 06. Refer to appropriate Diagnostic Mode 06 - Read Test Results for Specific Diagnostic Functions, ⇒ "3.3 Diagnostic Modes 01 - 09", page 11.		
	•	IGNITION: OFF.		
	•	SPECIFIED VALUE: Mode 6 Pass.		
	_	Were Values obtained? FAULT: Is intermittent.	(SW	agen AG
5	•	FAULT: Is intermittent.	♦	GO TO: Step 8 <u>⇒ page 206</u> .
	•	PERFORM: Visual Inspection of wiring and component.		"d'antee or
	•	CHECK: Wiring for open, high resistance, short or harness connector for damage, corrosion, loose or broken terminals.		GO TO: Step 8 ⇒ page 206 . VES:
	•	REPAIR: Faulty wiring or connector.		TO MARTIN
6	•	DISCONNECT: Oxygen Sensor 2 Before Catalytic Converter - GX11- harness connector.	-	YES: GO TO: Step 7 <u>⇒ page 205</u> .
	•	START: Engine and let Idle.	_	NO:
	•	CHECK: Oxygen Sensor 2 Before Catalytic Converter - GX11- component connector terminals 3 to 4 for voltage.	•	REPLACE Oxygen Sensor 2 Before Catalytic Converter - GX11 Refer to appropriate repair manual.
		IGNITION: OFF.	•	GO TO: Step 8 <u>⇒ page 206</u> .
		SPECIFIED VALUE: 0.0 V to 1.0 V.		GO TO: Step 8 ⇒ page 206 . Ssof information
	_	Was Value obtained?		natio
7	•	REMOVE: Engine Control Module - J623 Refer to appropriate repair manual.	-	YES: GO TO: Step 8 ⇒ page 206
	•	CHECK: Oxygen Sensor 2 Before Catalytic Converter - GX11- harness connector terminal 2 to the Engine Control Module - J623- harness connector T94 / 29 for resistance.	- ◆	NO: PERFORM: Visual Inspection of wiring and component. CHECK: Wiring for open, high resistance,
	•	CHECK: Oxygen Sensor 2 Before Catalytic Converter - GX11- harness connector terminal 3 to the Engine Control Module - J623- harness connector T94 / 34 for resistance.	•	short or harness connector for damage, corrosion, foose or broken terminals. REPAIR: Faulty wiring or connector.
	•	CHECK: Oxygen Sensor 2 Before Catalytic Converter - GX11- harness connector terminal 4 to the Engine Control Module - J623- harness connector T94 / 62 for resistance.	*	GO TO: Step 8 <u>⇒ page 206</u> .
	•	SPECIFIED VALUE: 0.5 Ω (\pm 0.3 Ω).		
		Were Values obtained?		

Step	Procedure	Result / Action to Take			
8	 Final Procedure Perform a road test to verify repair. Does the original DTC return? 	 YES: CHECK: Engine Control Module - J623- harness connector for any damaged, pushed-out pins. 			
	- Does the original DTC return:	REPAIR: As necessary.			
		♦ If all electrical connections are OK:			
		REPLACE: Engine Control Module - J623 Refer to appropriate repair manual.			
		◆ Clear the DTC's. Refer to ⇒ "3.3.4 Diagnostic Mode 04 - Erase DTC Memory", page 15			
		 Repair is complete. Generate Readiness Code. Refer to ⇒ "3.2 Readiness Code", page 9 			
		♦ Return vehicle to Customer.			
		 NO: ◆ Perform the diagnostic procedure for any DTC's. 			
		♦ If no DTC's return the repair is complete.			
		Return vehicle to customer.			
Perform the diagnostic procedure for any DTC's. If no DTC's return the repair is complete. Return vehicle to customer. 3.6.27 Three Way Catalytic Converter (TWC), Checking General Description A catalytic converter is a vehicle emissions control device that converts toxic pollutants in exhaust gas to less toxic pollutants by catalyzing a redox/reaction (oxidation). Catalytic converters are used in internal combustion engines. General recommendations Oxygen sensors OK. No leaks or damage to exhaust system. Prior to repair work, perform a preliminary check to verify the condition. Refer to 2 3.1 Preliminary Check", page 9. Test requirements Fuses OK. Battery voltage OK. Switch OFF All electrical and electronic accessories. Vehicles with Auto. Transmission, ensure Selector Lever position is in "P". Vehicles with Manual Transmission, ensure Shifter Lever position is in "N" with Parking Brake applied. Observe all safety precautions: 2 "1.1 Safety Precautions", page 2. View clean working conditions: 3 "1.2 Clean Working Conditions", page 4.					
Test	requirements	of in			
• Fu	uses OK.	Orma			
• B	attery voltage OK.	tionin			
	witch OFF All electrical and electronic accessories.				
• Vo	Vehicles with Auto. Transmission, ensure Selector Lever position is in "P".				
• V	Vehicles with Manual Transmission, ensure Shifter Lever position is in "N" with Parking Brake applied.				
• O <u>⇒</u>	Observe all safety precautions: ⇒ "1.1 Safety Precautions", page 2.				
 View clean working conditions: . ⇒ "1.2 Clean Working Conditions", page 4 					

Three Way Catalytic Converter (TWC), 3.6.27 Checking

General Description

General recommendations

- Fuses OK.
- Battery voltage OK.
- Switch OFF All electrical and electronic accessories.
- Vehicles with Auto. Transmission, ensure Selector Lever position is in "P".
- Vehicles with Manual Transmission, ensure Shifter Lever position is in "N" with Parking Brake applied.
- Observe all safety precautions: ⇒ "1.1 Safety Precautions", page 2.
- View clean working conditions: . ⇒ "1.2 Clean Working Conditions", page 4.

Function test

Step	Procedure	Result / Action to Take		
1	Activate Monitors:	◆ Check the exhaust system for leaks.		
	 Perform the function test located in Diagnostic Mode 06. Refer to appropriate Diagnostic Mode 06 - Read Test Results for Specific Di- 	◆ If necessary, repair the leak(s) in the exhaust system.		
	agnostic Functions, ⇒ "3.3 Diagnostic Modes 01 - 09", page 11	♦ GO TO: Step 2 ⇒ page 207 .		
	 End diagnosis and switch the ignition off. 			
	If the specified values are exceeded:			
2	O2 Sensor Monitoring: • Erase the DTC memory. Refer to	◆ Generate readiness code. Refer to ⇒ "3.2 Readiness Code", page 9.		
	⇒ "3.3.4 Diagnostic Mode 04 - Erase DTC Memory", page 15	♦ If no leaks are found in the exhaust system:		
	Perform a road test to verify Repair.	Replace the catalytic converter with front exhaust pipe. Refer to appropriate repair manual.		
	If the DTC does not return: [Sauthorized by [Sauth	◆ GO TO: Step 3 <u>⇒ page 207</u> .		
3	• Final procedure:	After the repair work, the following work steps must be performed in the following sequence:		
	Perform a road test to verify repair.	Check the DTC memory. Refer to ⇒ "3.3.3 Diagnostic Mode 03 - Read DTC Memory", page 14		
	mercial purposes, in part orin whole, is not be,	• If necessary, erase the DTC memory. Refer to ⇒ "3.3.4 Diagnostic Mode 04 - Erase DTC Memory", page 15		
	s, in par	 If the DTC memory was erased, generate readiness code. Refer to ⇒ "3.2 Readiness Code", page 9 Return vehicle to Customer. 		
	esodino	 ⇒ "3.2 Readiness Code", page 9 Return vehicle to Customer. 		
	mmerciali	informat		
3.6.2	8 Throttle Valve Control Module - G Checking	X3-,		
ener		illugat		
3.6.28 Throttle Valve Control Module - GX3-, Checking General Description Throttle valve operation occurs by an electric motor identified as EPC Throttle Drive - G186- located within the Throttle Valve Control Module - GX3 It is controlled by the Engine Control Module - J623- with primary inputs from the Accelerator Pedal Module - GX2- as well as other peripheral inputs from EPC Throttle Drive Angle Sensor 1 - G187- and EPC Throttle Drive Angle Sensor 2 - G188				
The Throttle Valve Control Module - GX3- contains the following components:				
Throttle Valve Control Module - J338-				

Throttle Valve Control Module - GX3-, 3.6.28 Checking

General Description



- ◆ Throttle Valve Control Module J338-
- EPC Throttle Drive G186-
- ♦ EPC Throttle Drive Angle Sensor 1 G187-
- ♦ EPC Throttle Drive Angle Sensor 2 G188-

The Throttle Valve Control Module - GX3- components cannot be serviced separately, and must be serviced as a unit.

Special tools and workshop equipment required

- Multimeter.
- Wiring Diagram.
- Scan Tool.

Test requirements

- Fuses OK.
- Battery voltage OK.
- Switch OFF All electrical and electronic accessories.
- Vehicles with Auto. Transmission, ensure Selector Lever position is in "P".
- Vehicles with Manual Transmission, ensure Shifter Lever position is in "N" with Parking Brake applied.
- Observe all safety precautions: ⇒ "1.1 Safety Precautions", page 2
- View clean working conditions: . ⇒ "1.2 Clean Working Conditions", page 4.

Step	Procedure	Result / Action to Take
1	 PERFORM: Preliminary Check to verify the customers complaint. Refer to ⇒ "3.1 Preliminary Check", page 9 Was Complaint Verified? 	 YES: GO TO: Step 2 ⇒ page 208 . NO: GATHER more information from customer about the complaint.
2	 CONNECT: Scan Tool. IGNITION: ON. CHECK: Throttle valve position closed: SPECIFIED VALUE: 3 – 25%. DEPRESS: Accelerator pedal slowly to WOT while observing the percentage display. The percentage display must increase uniformly. CHECK: Throttle valve position at WOT: SPECIFIED VALUE: 84 – 97%. IGNITION: OFF. Was Value obtained? 	 YES: CONDITION: May be intermittent. PERFORM: Visual Inspection of wiring and component. CHECK: Wiring for open, high resistance, short or harness connector for damage, corrosion, loose or broken terminals. REPAIR: Faulty wiring or connector. GO TO: Step 6 ⇒ page 209 . NO: GO TO: Step 3 ⇒ page 208 .
3	 REMOVE: Throttle Valve Control Module - GX3- far enough so that the harness connector terminals are accessible. DISCONNECT: Throttle Valve Control Module - GX3- harness connector. IGNITION: ON. CHECK: Throttle Valve Control Module - GX3- harness connector terminals 2 to 6 for voltage. SPECIFIED VALUE: About 5.0 V. IGNITION: OFF. Were Values obtained? 	 NO: GO TO: Step 4 ⇒ page 209 .

Step		Procedure		Result / Action to Take
4	•	REMOVE: Engine Control Module - J623	Ė	YES:
	•	Refer to appropriate repair manual. CHECK: Throttle Valve Control Module - GX3-harness connector terminal 2 to the Engine		GO TO: Step 6 <u>⇒ page 209</u> . NO: PERFORM: Visual Inspection of wiring and
		Control Module - J623- harness connector T60 / 12 for resistance.		component. CHECK: Wiring for open, high resistance,
	•	CHECK: Throttle Valve Control Module - GX3- harness connector terminal 6 to the Engine Control Module - J623- harness connector	ľ	short or harness connector for damage, corrosion, loose or broken terminals.
		T60 / 44 for resistance.	•	REPAIR: Faulty wiring or connector.
	•	SPECIFIED VALUE: 0.5 Ω (± 0.3 Ω).	•	GO TO: Step 6 ⇒ page 209 .
	_	Were Values obtained?		
5	•	REMOVE: Engine Control Module - J623 Refer to appropriate repair manual.	-	YES: REPLACE: Throttle Valve Control Module - GX3 Refer to appropriate repair manual.
	•	CHECK: Throttle Valve Control Module - GX3- harness connector terminal 1 to the Engine Control Module - J623- harness connector	•	GO TO: Step 6 <u>⇒ page 209</u> .
		T60 / 41 for resistance. CHECK: Throttle Valve Control Module - GX3-	→	NO: PERFORM: Visual Inspection of wiring and component.
		harness connector terminal 3 to the Engine Control Module - J623- harness connector T60 / 17 for resistance.		CHECK: Wiring for open, high resistance, short or harness connector for damage, corrosion, loose or broken terminals.
	•	CHECK: Throttle Valve Control Module - GX3-harness connector terminal 4 to the Engine	•	REPAIR: Faulty wiring or connector.
		T60 / 24 for resistance.	♦ A	GO TO: Step 6 spage 209.
	•	harness connector terminal 5 to the Engine Control Module - J623- harness connector T60 / 16 for resistance.	seo	REPAIR: Faulty wiring or connector. GO TO: Step 6 page 209
	•	SPECIFIED VALUE: 0.5 Ω (± 0.3 Ω)		
	_	Were Values obtained?		
6	•	Final Procedure	-	YES: CHECK: Engine Control Module - J623- har-
	• -	Perform a road test to verify repair. Does the original DTC return?		ness connector for any damaged, pushed-out pins.
		oart c	•	REPAIR: As necessary.
		.i.	•	If all electrical connections are OK:
		purposé	*	REPLACE: Engine Control Module - J623 Refer to appropriate repair manual.
		oophing of commercial purposes, in part of	•	ness connector for any damaged, pushed-out pins. REPAIR: As necessary. If all electrical connections are OK: REPLACE: Engine Control Module - J623 Refer to appropriate repair manual. Clear the DTC's. Refer to ⇒ "3.3.4 Diagnostic Mode 04 - Erase DTC Memory", page 15. Repair is complete. Generate Readiness Code. Refer to ⇒ "3.2 Readiness Code", page 9.
		o bo ale vide	•	Repair is complete. Generate Readiness Code. Refer to ⇒ "3.2 Readiness Code", page 9.
		*Olahado	•	Return vehicle to Customer.
		~ <i>14</i> ,	6 <u>1</u> ₩6	NO: Perform the diagnostic procedure for any DTC;
			•	If no DTC's return the repair is complete.
			•	Return vehicle to customer.

3.6.29 Turbocharger Recirculation Valve -N249-, Checking

General Description

A Turbocharger Recirculation Valve - N249- keeps a portion of air running through the intake side of the turbocharger when the throttle valve is closed and boost pressure is still present. This keeps the turbocharger impeller from slowing down, reducing turbo lag when the throttle is applied again.

Special tools and workshop equipment required

- Multimeter.
- Wiring Diagram.
- Scan Tool.

Test requirements

- Fuses OK.
- Battery voltage OK.
- Switch OFF All electrical and electronic accessories.
- Vehicles with Auto. Transmission, ensure Selector Lever position is in "P".
- Vehicles with Manual Transmission, ensure Shifter Lever position is in "N" with Parking Brake applied.
- Observe all safety precautions: ⇒ "1.1 Safety Precautions", page 2
- View clean working conditions: . ⇒ "1.2 Clean Working Conditions", page 4.

Step 1	Procedure Procedure PERFORM: Recliminary Check to verify the	905
1	PERFORM: Preliminary Check to verify the	372
	customers complaint. Refer to ⇒ "3.1 Preliminary Check", page 9 - Was Complaint verified?	 YES: GO TO: Step 2 ⇒ page 210 . NO: GATHER more information from customer about the complaint.
	 IGNITION: OFF. DISCONNECT: Turbocharger Recirculation Valve - N249- harness connector. CHECK: Turbocharger Recirculation Valve - N249- component connector terminals 1 to 2 for resistance. SPECIFIED VALUE: 3 – 15 Ω (at approx. 20° C). Was Value obtained? 	 YES: GO TO: Step 3 ⇒ page 211 . NO: REPLACE: Turbocharger Recirculation Valve - N249 Refer to appropriate repair manual. GO TO: Step 5 ⇒ page 211 .
210	Rep. Gr.ST - Generic Scan Tool	Dewesho Veringingo ing Bruson 1991

Step		Procedure		Result / Action to Take
3	•	IGNITION: ON. CHECK: Turbocharger Recirculation Valve -	-	YES: GO TO: Step 4 <u>⇒ page 211</u> .
	•	N249- harness connector terminal 1 to ground for voltage.		NO: PERFORM: Visual Inspection of wiring and component.
	•	IGNITION: OFF. SPECIFIED VALUE: Battery voltage. Was Value obtained?	•	CHECK: Wiring for open, high resistance, short or harness connector for damage, corsion, loose or broken terminals.
		was value obtained:	•	REPAIR: Faulty wiring or connector.
			•	GO TO: Step 5 ⇒ page 211 .
4	•	REMOVE: Engine Control Module - J623 Refer to appropriate repair manual.	-	YES: GO TO: Step 5 ⇒ page 211 .
	•	CHECK: Turbocharger Recirculation Valve - N249- harness connector terminal 2 to the Engine Control Module - J623- harness connector		NO: PERFORM: Visual Inspection of wiring and component.
	•	T60 / 50 for resistance. SPECIFIED VALUE: 0.5 Ω (± 0.3 Ω).	•	CHECK: Wiring for open, high resistance, short or harness connector for damage, consists leave as broken to mindle
	_	Was Value obtained?		sion, loose or broken terminals. REPAIR: Faulty wiring or connector.
			1	GO TO: Step 5 ⇒ page 211.
	•	Final Procedure Perform a road test to verify repair. Does the original DTC return?	- •	YES: CHECK: Engine Control Module - J623- haness connector for any damaged, pushed-pins.
			•	REPAIR: As necessary.
			•	If all electrical connections are OK:
		Nolkswagen AG. Volkswagen AG does not out	•	REPLACE: Engine Control Module - J623-Refer to appropriate repair manual.
%	3558	guthorised by Volkswagen AG. Volkswagen AG does not guarante	♦ Oriq	Clear the DTC's. Refer to ⇒ "3.3.4 Diagnostic Mode 04 - Erase DTC Memory", page 15
DOTMITOU			•	Repair is complete. Generate Readiness Code. Refer to ⇒ "3.2 Readiness Code", page 9.
			•	Return vehicle to Customer.
3.6.3			- •	NO: Perform the diagnostic procedure for any DTC's.
			♦	If no DTC's return the repair is complete.
			•	Return vehicle to customer.
				ess of informationing
	_	T Y A A A Y . . A		into
3.6.3	0	Wastegate Bypass Regulator Val	ve	matic
2		N75- , Checking		nin

Wastegate Bypass Regulator Valve -3.6.30 N75-, Checking

General Description

Both the boost and intake pressures are used to control the wastegate of the turbocharger. These pressure signals are supplied to the Engine Control Module - J623-, which then sends a pulse-width modulated signal to the Wastegate Bypass Regulator Valve - N75-. As a result, the Wastegate Bypass Regulator Valve

- N75- controls vacuum supply to the Pressure Unit, which directly acts on the wastegate via a connecting rod. This control system regulates the turbine speed and sets the maximum boost pressure.

Special tools and workshop equipment required

- Multimeter.
- Wiring Diagram.
- ♦ Scan Tool.

Test requirements

- Fuses OK.

 Battery voltage OK.

 AG. Volkswagen AG. does not guarantee of the state of the state
- Vehicles with Auto. Transmission, ensure Selector Lever position is in "P".
- Vehicles with Manual Transmission, ensure Shifter Lever position is in "N" with Parking Brake applied.
- Observe all safety precautions: ⇒ "1.1 Safety Precautions", page 2
- View clean working conditions: . ⇒ "1.2 Clean Working Conditions", page 4.

Step	Procedure	Result / Action to Take		
1 2 2	 PERFORM: Preliminary Check to verify the customers complaint. Refer to ⇒ "3.1 Preliminary Check", page 9. Was Complaint verified? IGNITION: OFF. DISCONNECT: Wastegate Bypass Regulator Valve - N75- harness connector. CHECK: Wastegate Bypass Regulator Valve - N75- component connector terminals 1 to 2 for resistance. SPECIFIED VALUE: 5 – 25 Ω (at approx. 20° C). 	 YES: GO TO: Step 2 ⇒ page 212. NO: GATHER more information from customer about the complaint. YES: GO TO: Step 3 ⇒ page 212. NO: REPLACE: Wastegate Bypass Regulator Valve - N75 Refer to appropriate repair manual. GO TO: Step 5 ⇒ page 213. 		
3	 Was Value obtained? IGNITION: ON. CHECK: Wastegate Bypass Regulator Valve - N75- harness connector terminal 1 to ground. IGNITION: OFF. SPECIFIED VALUE: Battery voltage. Was Value obtained? 	 YES: GO TO: Step 4 ⇒ page 213. NO: PERFORM: Visual Inspection of wiring and component. CHECK: Wiring for open, high resistance, short or harness connector for damage, corrosion, loose or broken terminals. REPAIR: Faulty wiring or connector. GO TO: Step 5 ⇒ page 213. 		

Step	Procedure	Result / Action to Take
4	REMOVE: Engine Control Module - J623 Refer to appropriate repair manual.	 YES: GO TO: Step 5 ⇒ page 213 .
	 CHECK: Wastegate Bypass Regulator Valve - N75- harness connector terminal 2 to the Engine Control Module - J623- harness connector terminal T60 / 3 for resistance. SPECIFIED VALUE: 0.5 Ω (± 0.3 Ω). Was Value obtained? 	◆ PERFORM: Visual Inspection of wiring and
		♦ CHECK: Wiring for open, high resistance, short or harness connector for damage, corr sion, loose or broken terminals.
	- was value obtained:	◆ REPAIR: Faulty wiring or connector.
		♦ GO TO: Step 5 ⇒ page 213 .
5	 Final Procedure Perform a road test to verify repair. Does the original DTC return? 	 YES: ◆ CHECK: Engine Control Module - J623- har ness connector for any damaged, pushed-opins.
		◆ REPAIR: As necessary.
		♦ If all electrical connections are OK:
Whole	Does the original DTC return?	◆ REPLACE: Engine Control Module - J623 Refer to appropriate repair manual.
		♦ Clear the DTC's. Refer to "3.3.4 Diagnostic Mode 04 - Erase DTC Memory", page 15.
	ikedunies saut	 Repair is complete. Generate Readiness Code. Refer to ⇒ "3.2 Readiness Code", page 9
		Return vehicle to Customer.
		 NO: ◆ Perform the diagnostic procedure for any DTC's.
orin		♦ If no DTC's return the repair is complete.
part		Return vehicle to customer.
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Cautions & Warnings

Please read these WARNINGS and CAUTIONS before proceeding with maintenance and repair work. You must answer that you have read and you understand these WARNINGS and CAUTIONS before you will be allowed to view this information.

- If you lack the skills, tools and equipment, or a suitable workshop for any procedure described in this manual, we suggest you leave such repairs to an authorized Volkswagen retailer or other qualified shop. We especially urge you to consult an authorized Volkswagen retailer before beginning repairs on any vehicle that may still be covered wholly or in part by any of the extensive warranties issued by Volkswagen.
- Disconnect the battery negative terminal (ground strap) whenever you work on the fuel system or the electrical system. Do not smoke or work near heaters or other fire hazards. Keep an approved fire extinguisher handy.
- Volkswagen is constantly improving its vehicles and sometimes these changes, both in parts and specifications, are made applicable to earlier models. Therefore, part numbers listed in this manual are for reference only. Always check with your authorized Volkswagen retailer parts department for the latest information.
- Any time the battery has been disconnected on an automatic transmission vehicle, it will be necessary to reestablish Transmission Control Module (TCM) basic settings using the VAG 1551 Scan Tool (ST).
- Never work under a lifted vehicle unless it is solidly supported on stands designed for the purpose. Do not support a vehicle on cinder blocks, hollow tiles or other props that may crumble under continuous load. Never work under a vehicle that is supported solely by a jack. Never work under the vehicle while the engine is running.
- For vehicles equipped with an anti-theft radio, be sure of the correct radio activation code before disconnecting the battery or removing the radio. If the wrong code is entered when the power is restored, the radio may lock up and become inoperable, even if the correct code is used in a later attempt.
- If you are going to work under a vehicle on the ground, make sure that the ground is level. Block the wheels to keep the vehicle from rolling. Disconnect the battery negative terminal (ground strap) to prevent others from starting the vehicle while you are under it.
- Do not attempt to work on your vehicle if you do not feel well. You increase the danger of injury to yourself and
 others if you are tired, upset or have taken medicine or any other substances that may impair you or keep you from
 being fully alert.
- Never run the engine unless the work area is well ventilated. Carbon monoxide (CO) kills.
- Always observe good workshop practices. Wear goggles when you operate machine tools or work with acid. Wear
 goggles, gloves and other protective clothing whenever the job requires working with harmful substances.
- Tie long hair behind your head. Do not wear a necktie, a scarf, loose clothing, or a necklace when you work near machine tools or running engines. If your hair, clothing, or jewelry were to get caught in the machinery, severe injury could result.
- Do not re-use any fasteners that are worn or deformed in normal use. Some fasteners are designed to be used only once and are unreliable and may fail if used a second time. This includes, but is not limited to, nuts, bolts, washers, circlips and cotter pins. Always follow the recommendations in this manual replace these fasteners with new parts where indicated, and any other time it is deemed necessary by inspection.

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- Illuminate the work area adequately but safely. Use a portable safety light for working inside or under the vehicle. Make sure the bulb is enclosed by a wire cage. The hot filament of an accidentally broken bulb can ignite spilled filel or oil.
- Friction materials such as brake pads and clutch discs may contain asbestos fibers. Do not create dust by grinding, sanding, or by cleaning with compressed air. Avoid breathing asbestos fibers and asbestos dust. Breathing asbestos can cause serious diseases such as asbestosis or cancer, and may result in death.
- Finger rings should be removed so that they cannot cause electrical shorts, get caught in running machinery, or be crushed by heavy parts.
- Before starting a job, make certain that you have all the necessary tools and parts on hand. Read all the
 instructions thoroughly; do not attempt shortcuts. Use tools that are appropriate to the work and use only
 replacement parts meeting Volkswagen specifications. Makeshift tools, parts and procedures will not make good
 repairs.
- Catch draining fuel, oil or brake fluid in suitable containers. Do not use empty food or beverage containers that might mislead someone into drinking from them. Store flammable fluids away from fire hazards. Wipe up spills at once, but do not store the oily rags, which can ignite and burn spontaneously.
- Use pneumatic and electric tools only to loosen threaded parts and fasteners. Never use these tools to tighten fasteners, especially on light alloy parts. Always use a torque wrench to tighten fasteners to the tightening torque listed.
- Keep sparks, lighted matches, and open flame away from the top of the battery. If escaping hydrogen gas is ignited, it will ignite gas trapped in the cells and cause the battery to explode.
- Be mindful of the environment and ecology. Before you drain the crankcase, find out the proper way to dispose of the oil. Do not pour oil onto the ground, down a drain, or into a stream, pond, or lake. Consult local ordinances that govern the disposal of wastes.
- The air-conditioning (A/C) system is filled with a chemical refrigerant that is hazardous. The A/C system should be serviced only by trained automotive service technicians using approved refrigerant recovery/recycling equipment, trained in related safety precautions, and familiar with regulations governing the discharging and disposal of automotive chemical refrigerants.
- Before doing any electrical welding on vehicles equipped with anti-lock brakes (ABS), disconnect the battery negative terminal (ground strap) and the ABS control module connector.
- Do not expose any part of the A/C system to high temperatures such as open flame. Excessive heat will increase system pressure and may cause the system to burst.
- When boost-charging the battery, first remove the fuses for the Engine Control Module (ECM), the Transmission Control Module (TCM), the ABS control module, and the trip computer. In cases where one or more of these components is not separately fused, disconnect the control module connector(s).
- Some of the vehicles covered by this manual are equipped with a supplemental restraint system (SRS), that
 automatically deploys an airbag in the event of a frontal impact. The airbag is operated by an explosive device.
 Handled improperly or without adequate safeguards, it can be accidentally activated and cause serious personal
 injury. To guard against personal injury or airbag system failure, only trained Volkswagen Service technicians
 should test, disassemble or service the airbag system.

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- Do not quick-charge the battery (for boost starting) for longer than one minute, and do not exceed 16.5 volts at the battery with the boosting cables attached. Wait at least one minute before boosting the battery a second time.
- Never use a test light to conduct electrical tests of the airbag system. The system must only be tested by trained Volkswagen Service technicians using the VAG 1551 Scan Tool (ST) on an approved equivalent. The airbag unit must never be electrically tested while it is not installed in the vehicle.
- Some aerosol tire inflators are highly flammable. Be extremely cautious when repairing a tire that may have been inflated using an aerosol tire inflator. Keep sparks, open flame or other sources of ignition away from the tire repair area. Inflate and deflate the tire at least four times before breaking the bead from the rim. Completely remove the tire from the rim before attempting any repair.
- When driving or riding in an airbag-equipped vehicle, never hold test equipment in your hands or lap while the vehicle is in motion. Objects between you and the airbag can increase the risk of injury in an accident.

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